The Mining Journal
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Railway & Commercial Gazette

Vol. CCXLV No. 6267 LONDON, SEPTEMBER 30, 1955 PRICE 8d.


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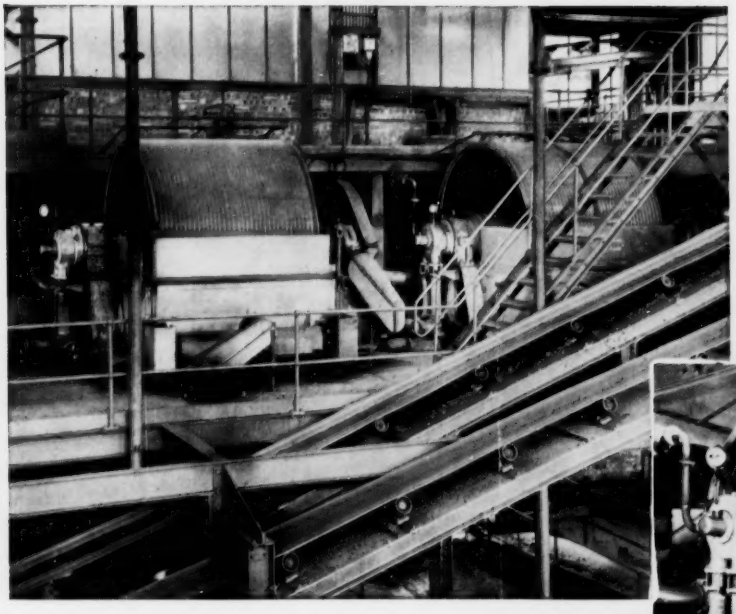

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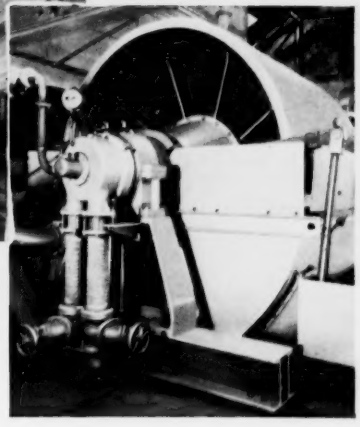

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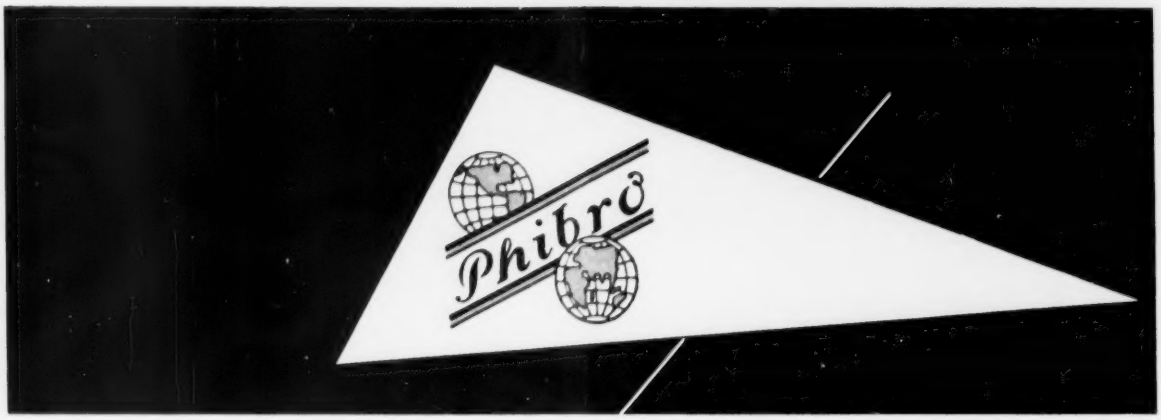


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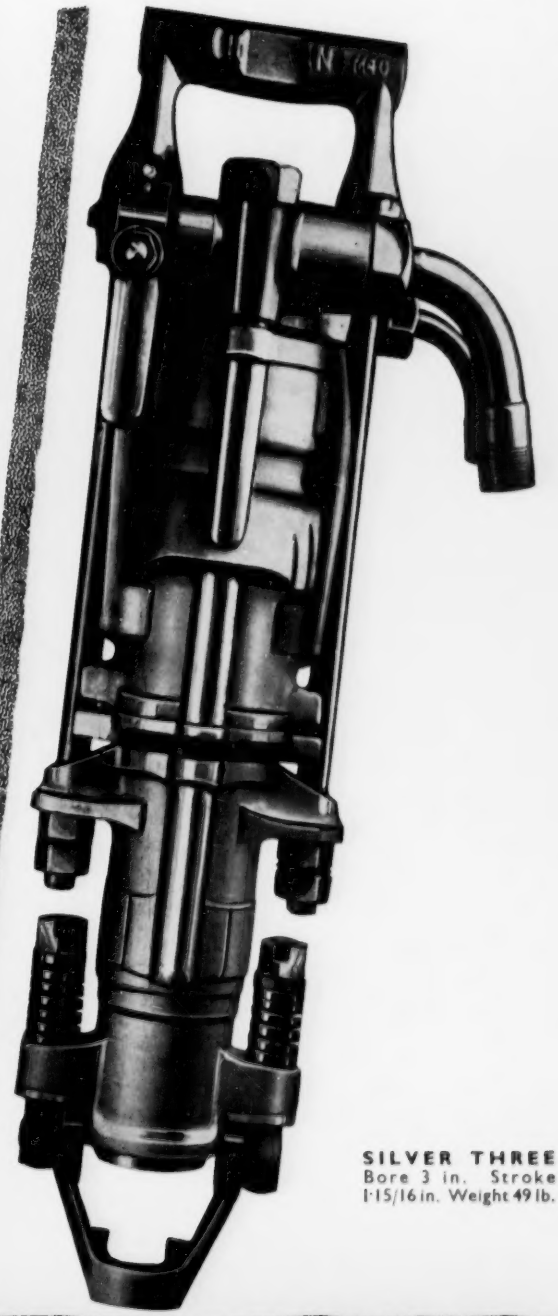

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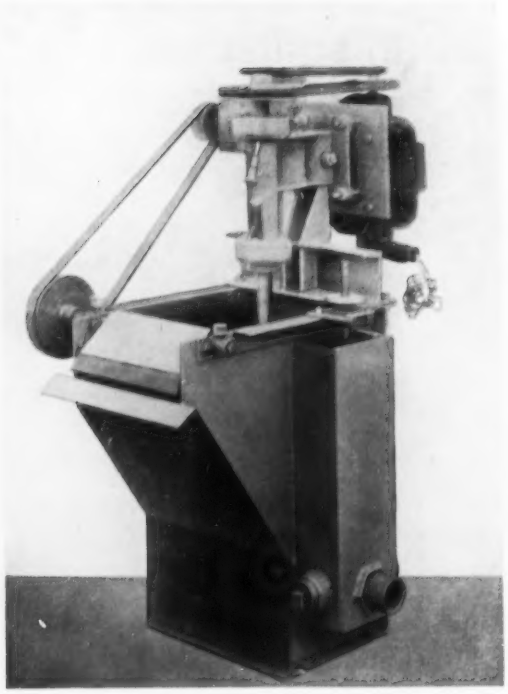

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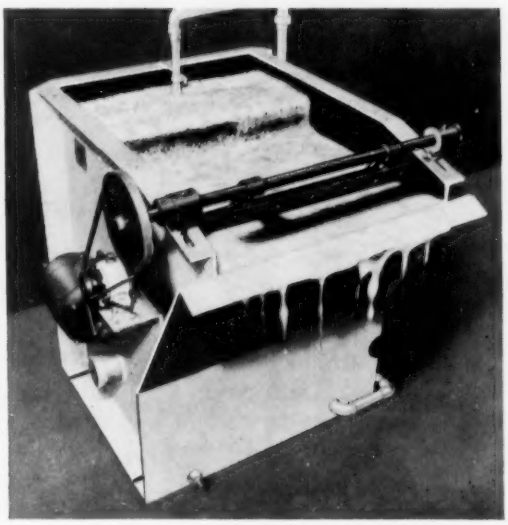

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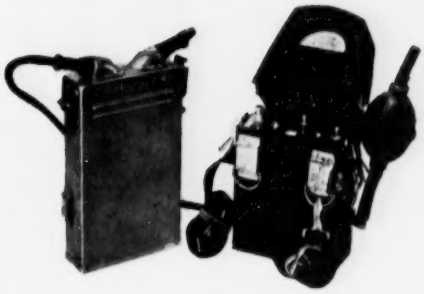

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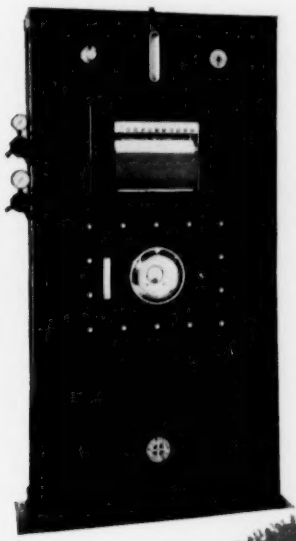

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*Established 1835*

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# NOTES AND COMMENTS

## The Scope for U.S. Tariff Reductions

Hard on the heels of Mr. Butler's accusation of "back-pedalling" the American Administration has produced a list of 900 items on which it is prepared to negotiate tariff reductions under the foreign trade legislation enacted earlier this year. It should first be said that, as we go to press, a full list of the items is still not available in London, but that does not preclude some study of the implications of the list or of the events which have taken place since it was issued.

The list is not, of course, a rejoinder to Mr. Butler since its compilation has long been in train. Nor, at the same time, does it altogether dispel the impression that Mr. Butler's judgment may still be true. Certain immediate qualifications need to be made. The list does not appear to include bicycles, watches or oil on which tariffs have been raised or imports quantitatively restricted; there is provision for domestic protest against the list before negotiations begin and there are many items such as pottery on which protests will be strongly made; the negotiations will not begin till next January and will only be made against *quid pro quos* acceptable to the United States; finally even negotiated reductions may be cancelled subsequently by invocation of peril clauses.

The items, if taken together, accounted for $1,722,000,000 of imports into the United States last year and mined products are probably the most important group—copper, manganese and tungsten ores, nickel and aluminium among them—as well as steels. Lest anyone should be wondering where he has seen the list before, the answer is in the Paley Report. It should not be thought that the Eisenhower Administration is not prepared to make a genuine effort to reduce tariffs on certain manufactures or to face the inevitable rumble of complaint from domestic producers, but the most important items on it are imports, particularly metallic imports, of which the United States stands in serious need. Furthermore, although copper figures very prominently in the list it is well known that, for some years, the import duty on copper has been lifted and that, more recently, the export of American produced copper has been virtually banned. It is true that the lifting of copper import duty has to be renewed from year to year but he would be a bold man who would say when the price of copper will fall to a level at which the duties again become necessary. In other words, the United States is seeking to negotiate (and it is worth emphasizing that reductions will have to be negotiated and that nothing is going to be given away) tariff reductions and strengthen her raw material position at one and the same time.

The second important point about the negotiations is that the protectionist group will bring its pressure to bear before they start and while they are on. It is worth recalling that the protectionists had to be bought off, during the passage of the Foreign Trade Bill, with promises as to how the Act would be interpreted; for example, although a cut in oil imports was not written into the Act the recently ordered "voluntary" cuts were only a redemption of a pledge that the Texas oil industry would be protected. Similarly, protectionists regard the Eisenhower Administration as being on sufferance and are ready to pounce on any Presidential decisions that will strengthen their case for placing tariff negotiations directly under Congress control. Some of the protectionists, the lead and zinc producers, the makers of bicycles and watches for example, are not threatened with tariff reductions, but what was apparent during the passage of the Foreign Trade Bill was the co-ordination and cohesion of the protectionists no matter what industry seemed to be in danger.

With the future course of these negotiations so very much dependent on personal pressures and personal interpretations, and with President Eisenhower himself leading the liberal school within the Administration and Republican Party, the unfortunate illness of the President throws the entire scheme for tariff reduction in a new light. Will the President be strong enough to exert an influence on these negotiations (and it took all his personal prestige to carry the Foreign Trade Bill); and if he is not, will the negotiations turn out to be merely a means of making good Americas' mineral deficiencies? Secondly, if Mr. Eisenhower decides not to stand again for President (and the chances that he will not must now be enormously greater, to put it no stronger) will not the Republicans play safe during this last crucial year and refrain from annoying domestic interests by lowering tariffs on their products? For if the Republicans are to regain control without Mr. Eisenhower they must tread warily indeed; the battle cry "Foreigners have no votes" will be heard again.

Until the Administration's intentions are much clearer

and, perhaps more important, until Mr. Eisenhower's personal future becomes much clearer, it is hardly possible to assess the importance of this latest American gesture. Probably nothing can stop the Geneva negotiations next January from effecting tariff reductions on the metals and metalliferous ores of which the U.S. is fast running short; but whether the negotiations will produce a major step forward in freeing international trade is another matter.

**African Advancement Without the Veto**

Discussing the Copperbelt African advancement agreements here a couple of weeks ago, we suggested that both Anglo American and R.S.T. would doubtless wish to replace these new mine-by-mine-agreements by an agreement between the Chamber of Mines and the European Mineworkers as soon as an acceptable basis could be found. That it has now been possible to take this step so soon appears, from the brief despatches so far reaching us, to have owed something to the initiative of the union in urging both groups to bring their agreements into line.

The union has now facilitated this step by accepting a Chamber of Mines' agreement on apparently identical terms with the existing R.S.T. agreement thereby voluntarily surrendering whatever advantages it may have thought it secured through its earlier agreement with Anglo American. But these advantages—the granting of the "veto" and the explicit deferment for three years of negotiations over further steps in African advancement—have, in our view, always been more apparent than real. In any event, whatever practical value they may have had was obviously negatived by the terms of the subsequent R.S.T. agreement as it could hardly be supposed that the European union would at some future stage be prepared to grant more favourable conditions to R.S.T. than to Anglo American.

The great essential point is that Copperbelt labour relations on this issue are now restored to a normal Chamber of Mines basis, and the way seems to be cleared for gradual African advancement.

Yet this week's agreement still only represents the consolidation of a first step forward and we must hope that similarly wise councils will prevail when the time comes to consider the further steps in Africanization which may be expected to arise from the recommendations of the independent enquiry which the Chamber of Mines and the union are jointly to set in motion. At the same time it must be hoped that with the question of the formal veto out of the way, the African mineworkers will see the present agreement for what it is—a first and positive advance towards the partnership ideal.

**Uranium Secrets May be Released**

The United States Atomic Energy Commission has declassified all technical information on currently-used extraction processes for recovering uranium as unrefined uranium concentrates. However, this de-classification action does not encompass information relating to the refinement of uranium concentrates into highly purified forms, nor does it include technical information concerning any new and important extraction processes which may be developed.

As a result of the U.S. decision to make available all technical information on the present extraction processes, Mr. J. A. Reid, secretary of the South African Atomic Energy Board, said that the Union's Atomic Energy Act might be amended. As matters now stood the law prohibited the release of this information, but since it was now to be made available elsewhere the South African Atomic Energy Board was reconsidering its position.

# Brazil

*(From Our Own Correspondent)*

Teresopolis, September 6.

The volume of Brazil's mineral exports rose from 1,044,662 tons in 1950 to 1,777,855 in 1954, due to increased shipments of iron ore. The value on the other hand, which rose to the equivalent of U.S. $41,440,000 in 1952, dropped to $29,546,000 in 1954, owing to a general decline in world prices.

Comparing 1952 with 1954, iron ore exports increased by 117,632 tons last year, but the value dropped by U.S. $2,020,000 to $21,585,000.

**DECLINE IN EXPORTS**

All other principal mineral exports declined both in volume and value last year, as shown in the following table:

| | *1952* | *1954* | *1952* | *1954* |
|---|---|---|---|---|
| | *(tons)* | | *(U.S. $1,000)* | |
| Manganese ... ... | 161,401 | 94,379 | 4,496 | 3,084 |
| Tungsten ... ... | 1,647 | 1,267 | 7,429 | 2,195 |
| Beryllium ... ... | 2,479 | 1,273 | 1,328 | 662 |
| Zirconium ... ... | 2,200 | 1,200 | 248 | 125 |
| Mica ... ... ... | 1,260 | 661 | 1,045 | 305 |

The average price of Brazilian manganese dropped from U.S. $33.70 per ton in 1953 to $32.70 in 1954 and $31.40 during the first quarter of 1955. During the first quarter of 1955 the volume of exports recovered slightly, as compared with the corresponding period of 1954. Exports of iron ore increased by 419,620 tons, to 815,231; manganese by 26,359, to 67,805; scheelite by 17, to 219; mica by 89, to 245, quartz by 136, to 310 tons.

The United States continues to be Brazil's principal market, although exports of iron ore to the United Kingdom reached 209,885 tons in the first half of 1955. Shipments to Germany are also increasing.

Manganese is still shipped from the Conselheiro Lafaiete mines, in Minas Geraes, but the reserves of high-grade ore have been seriously depleted in recent years. Exports will be confined as soon as possible to the Urucum deposits, in Matto Grosso, and those of Serra do Navio, in the Amapa Territory. The reserves of the former are calculated at 30,000,000 tons, averaging 45.6 per cent Mn and 11.1 per cent Fe. Those of Serra do Navio are estimated at 14,000,000 tons, with 44 per cent Mn. Exports from the latter, in which Bethlehem Steel is interested, should begin in 1956 and may reach 500,000 tons annually.

Brazil, as the principal source of supply of beryllium to the United States, could produce 3,500 tons yearly, but exploitation is in the hands of fossickers and output depends entirely upon foreign demand. Zirconium minerals are exported in concentrated form. Baddeleyite is concentrated by manual selection, zirconite by mechanical processes. Prices per ton have dropped from $112.90 in 1953 to $63.70 this year.

In addition, the United States is the principal market for Brazilian mica, chiefly muscovite, 90 per cent of which is produced in Minas Geraes. Export prices dropped from $2,102.70 per ton in 1947 to $263.40 in 1953, but recovered to $633.90 in the first quarter of 1955. Brazil is practically the only producer of piezoelectric quartz and 11,655 tons were exported in 1940-44. Prices averaged $14,929.40 per ton in 1946, but are now down to $1,793.30.

In July last mineral exports were transferred from Categories 2 and 3 to 4, raising the subsidy from 52.36 and 69.16 cruzeiros per £ to 88.76. The object was to facilitate foreign sales. Progressive depreciation of the cruzeiro and rising production costs tend to exclude Brazil's exportable products from world markets.

# The Western Outlook on the U.S. Metal Mining Industry

**In an address delivered before the annual meeting of the Idaho Mining Association on September 9, 1955, Mr. O. Herres, vice-president of the Combined Metals Reduction Company and chairman of the National Lead and Zinc Committee, discussed the outlook for the metal mining industry in the United States. The article which follows is a condensation of his remarks as reported in *The American Metal Market*, and it will be seen that many of the ills of lead-zinc production in the U.S. are claimed to rise from the differences of opinion existing in eastern and western states, while his criticism of stockpiling practice is marked.**

The metal mining industry is fighting for survival in the United States along many fronts. Rising costs of production, world competition, excessive imports, foreign aid and political policies are among the difficulties that beset the industry.

Early in 1954 the price of zinc declined to 9¼ c. per lb. and lead to 12½ c. This discouraging drop in prices to unprofitable levels was caused by the dumping of excess stocks of foreign metal on the U.S. market at less than the cost of American production. Once-prosperous properties thus became losing ventures. Lead-zinc mines in the United States cannot pay wages of around $2 an hour and continue in existence on anything like 9¼ c. zinc. In consequence, U.S. mine output of lead and zinc decreased to the lowest tonnages since the depression years of 1931-1934.

## DIVIDED VIEWS

Many of these problems of the U.S. domestic mining industry arise from the fact that the country is divided into two camps in its political, economic and social views. Although the division is not altogether geographical, it may be observed that there is a considerable split in viewpoint between the eastern seaboard and the west.

Viewpoints may differ but American miners must have even competition with foreign producers in matters of competitive trade and government consideration if they are to continue the struggle to develop and produce the natural wealth of the nation.

The lead-zinc mines are in no position to support large wage increases and liberal social benefits when the price of their products is set in competitive world markets. Their increases cannot be passed along to the consumer as is the case with the current round of higher wages in the manufacturing industries.

Large corporations can take care of themselves much as the ore-transporters do that can no longer operate under the American flag. They can move to foreign countries and receive assistance from our Government in their efforts to produce profitably when metal prices drop too low to permit profitable mining under American wages and living standards. And now it is proposed to offer them an additional inducement of a tax rate 14 percentage points lower on income from foreign operations than the rate on domestic income.

The President has proposed to Congress that corporations engaged in business abroad be taxed at a maximum of eight per cent instead of the 52 per cent which applies in the United States.

## STOCKPILING WORLD PRODUCTION

Although temporarily helpful, it is becoming increasingly evident that stockpiling is not accomplishing its intended purpose. Domestic mine production has decreased while lead and zinc producers throughout the world have been greatly benefited by our stockpile buying. Stockpiling will not cure an excess supply of foreign lead and zinc flowing to this country. In the absence of restrictions it will encourage the expansion of foreign production and bring in more imports to the extent that it increases prices to an adequate level.

Until the channels of trade for the industry were distorted by the Korean emergency and by the flooding of U.S. markets with excessive imports when the emergency ended, the U.S. took over 600,000 tons a year of its zinc from domestic mines and less than 400,000 tons from foreign markets.

For the twelve years from 1941 to 1952, inclusive, U.S. mine production of zinc averaged more than 600,000 tons a year, varying from 749,125 tons in 1941 to 666,001 tons in 1952. Imports ranged from 197,000 tons in 1940 to 391,000 tons in 1951.

But during 1954, imports of zinc mounted to 605,000 tons and in 1953 to 748,000 tons. U.S. mines output suffered accordingly dropping to 465,000 tons last year. In consequence unemployment has risen in the industry and many mining communities are seriously affected.

Governmental purchases of zinc have helped the industry, but have not proven of adequate benefit to the mines. Mine production remains at depression lows. Although stockpile buying has transferred large tonnages of excess zinc and lead to the Government stockpile, the market price of lead has risen only 1 c. per lb. and zinc 1½ c. from their low levels of June, 1954. During the same period the prices of aluminium and copper have advanced approximately 3 c. and 13 c. per lb., respectively. Imports for the first half of this year came in at the same excessive rate of a year ago despite the President's admonition that foreign producers were not to take advantage of the stockpile programme.

## THE IMPORT PICTURE

Excessive imports of foreign ores have been taking over a larger proportion of U.S. smelter production at the expense of the nation's mines. Domestic mine output of zinc has been reduced to 42,000 tons a month from an average of 60,000 tons a month in early 1952. Imports of ores and metals are averaging 50,000 tons of zinc a month. Smelter production of zinc is at an all-time high while mine output of lead and zinc is at the low level of depression days.

Stockpiling alone will not cure excess tonnages of foreign lead and zinc flowing into the country. To the extent that it increases prices it encourages the expansion of foreign production to be shipped to our markets. It is no kindness to the foreign consumer to be forced to pay higher prices for his needs because our stockpiling, in the absence of tariff restrictions, raises world prices in greater proportion than our own.

The logical answer, it would seem, is the restriction of excess imports, but only when they are offered at prices that will destroy the lead-zinc mining industry in the United States.

# Desalting of Mine Waters

**The growing shortage of fresh water throughout the world is not merely confined to the more arid areas, while at the same time the disposal of waste waters from mining areas often proves to be extremely difficult. A constructive approach to the problem would appear to lie in the development of an economical method of producing fresh water from saline waters, and in the following article certain of the more promising methods of desalting mine waters are discussed.**

It was reported recently that Anglo American Corporation of South Africa in the Orange Free State goldfields had taken an option on 900 morgen at Ganspan, about 15 miles from Welkom and nine miles from Wesselsbron. This has drawn attention once again to the immensity of the problem presented by the 10,000,000 gallons of brackish water pumped to the surface daily by mines in the Welkom area. This water is too salty to be acceptable for river disposal or for agricultural use and has, therefore, to be led into specially constructed dams for evaporation. It is understood that if the mines acquire Ganspan, the intention is to use the pan primarily for the disposal of waste water.

The situation prevailing in the Orange Free State indicates once more the fact that the disposal of mine waste waters is often extremely difficult. Waters from coal mines cause little trouble in Britain, but severe pollution occurs in some American mining districts. It has been estimated that until remedial measures were taken, mine waters draining into the Ohio River and its tributaries contained acid equivalent to over 3,000,000 tons of sulphuric acid per year, resulting in damage and expenses amounting to some $10,000,000 annually. A large part of the cost was incurred in treating the acidic river water for domestic and industrial use.

While mining companies are frequently put to considerable expense and inconvenience in the disposal of waste waters, increasing difficulty is being experienced in many countries in providing adequate supplies of fresh water to meet the ever-growing needs arising from improved living standards and industrial expansion. In desert areas such as North Africa there are highly saline ground waters, which cannot be used for vegetable culture and must be distilled at great expense for household use. Supplies of freshened water are also needed in areas along the Red Sea, in parts of Southern Europe, Eastern Pakistan, Australia and Latin America, and in most arid small islands.

## SHORTAGE OF FRESH WATER

The growing shortage of fresh water is by no means confined to arid regions. In Holland the underground water level is falling and the water is becoming brackish. Even in Great Britain, despite its abundant rainfall, authorities in some areas are obliged to look further afield for water and it is becoming more and more difficult to find sources that do not involve expensive long-distance pumping.

In some river valleys of Europe and the United States, there is a growing tendency to re-use water by returning it to the river after suitable treatment in order that it may be drawn once again in another town lower down. The removal of organic agents is effected each time by biological agents at sewage disposal works, but so far no methods are available commercially for removing dissolved salts, which are thus present in higher concentrations after each cycle of re-use.

The most constructive approach to this urgent problem seems to lie in the development of practicable low-cost methods of producing fresh water from saline waters. Distillation processes which are technically feasible have been available for many years, but much research is still required before fresh water can be produced in large quantities at prices which municipal, industrial or agricultural users can afford to pay. The work now in progress is of great importance to the mining industry, since economic methods of large-scale demineralization would transform mine waste waters from troublesome and costly effluents into a commodity of great value, particularly in countries where supplies of fresh water for future development are limited. Even where no serious disposal problem was presented, many mining companies would benefit considerably from a process which allowed them to supply their own fresh water requirements by treating wastes.

## CURRENT INVESTIGATIONS

The United States views the future outlook for fresh water supplies with such concern that Congress has authorized an expenditure of up to $10,000,000 over 13 years on research and development. Talks on the possibilities of various methods of de-salting brackish water have been going on for some time under the auspices of OEEC and have led to proposals for international co-operation in research. Two projects have so far been put into operation and others are under consideration. In addition, much research is being undertaken in individual OEEC countries, both under Government auspices and by commercial firms.

Although techniques have been greatly improved by research, distillation still remains an expensive process. The world's largest sea water distillation plant is situated at Kuwait, and has enabled shortage of drinking water in this area to be partly overcome, but distillation costs are high despite the abundance of cheap waste fuels from the oil wells. Triple-effect evaporators are employed. The plant is at present capable of producing 2,000,000 gallons of fresh water per day, and has been laid out for an ultimate daily capacity of 5,000,000 gallons.

An OEEC project, sponsored by Britain, involves an attack on the problem of scale and foam in distillation equipment, which add considerably to operating costs. Outstanding results have been achieved by the British Admiralty's Materials Division at Plymouth, working exclusively on sea water. The Department of Scientific and Industrial Research has given £5,000 to pay for an extension of the research programme to cover other waters. A Dutch scientist is joining the Admiralty team.

Among the processes to which attention is currently being directed in the United States or Africa, are electrodialysis, ion exchange, vapour compression distillation, solar distillation, critical pressure devices, osmotic processes, solvent extraction, separation by freezing, and ultrasonic vibrations.

In vapour compression distillation saline water is evaporated at atmospheric pressure and the vapour is compressed to raise the pressure of the steam to about 3 lb. per sq. in. and the temperature to about 220 deg. F. The compressed steam is returned to the heating side of the evaporator tubes to heat more of the brine from which the original vapour was formed. Since the brine in the evaporator boils at 213 deg. F. there is a temperature differential of about 9 deg. F., which permits heat transfer

back to the brine. Nearly all the latent heat of the compressed steam is used in maintaining evaporation of the brine solution and condensation of the compressed steam occurs directly in the steam chest forming the distillate product. No separate condenser or cooling water is required.

In the United States a new process of vapour compression distillation is being developed on the principle that water can be made to evaporate at a small fraction of the energy formerly believed to be the practical minimum.

Ion exchange methods are applied commercially to the de-salting of waters containing up to about 1,000 parts per million of salts, but their application to waters of higher saline concentration involves the supply of correspondingly larger quantities of regenerating chemicals and becomes more costly. The development of improved ion exchange methods for the treatment of more highly concentrated waters has been proposed by France as a project suitable for co-operative research under OEEC.

## OTHER PROCESSES

The extraction of fresh water from brackish water by the use of solar energy is attractive because no fuel and little mechanical power are involved. On the other hand, a solar still covers a relatively large area and investment costs are high. The only device which, so far, has produced really practical results uses the so-called " glass-house effect ". It consists essentially of a black-bottomed trough holding the brackish water, and roofed with two transparent sheets, usually of glass, which meet at the pitch of the " roof " and overhang the trough. The sun's rays strike through the glass cover and evaporate the water, which condenses on the underside of the glass and is collected.

Despite their disadvantages, solar still holds promise for use in arid regions, where fuels are scarce and costly. An American worker has estimated that, if glass and framework were replaced by transparent and durable plastics which could be mass-produced, purified water might conceivably be produced by solar evaporation for as little as $1 per 1,000 gallons. It is also hoped that higher yields may be obtained from a tilted type of solar still now being studied at New York University, while promising results have also been achieved in Algeria. The French have suggested various aspects of solar distillation as possibilities for co-operative research under OEEC.

In areas where electrical power is cheap, the process known as electrodialysis offers encouraging prospects for the economical treatment of brackish water, but not sea water. The General Technical Department of TNO (the Netherlands equivalent of DSIR) has been engaged for some years on development work on this process, which is well advanced.

The Dutch recently offered to carry out development work on electrodialysis in co-operation with other countries showing an interest. Great Britain, South Africa, Australia and Algeria (representing France) have joined the Netherlands in paying for this work. The problems to be solved are mainly those of bringing up the process from small to large pilot scale. All the co-operating countries will share in the knowledge arising from this research and in any patents that may be taken out in the future. Results which the previous Dutch work produced will also be shared.

This process has also been under investigation in South Africa by the National Chemical Research Laboratory of the Council for Scientific and Industrial Research, who are collaborating with the mining groups, headed by the Anglo American Corporation of South Africa, in seeking a solution to the problem presented by brackish water in the Orange Free State Goldfields. These investigations have been described by Dr. W. S. Rapson, Director of the National Chemical Research Labatory (*Optima*, June, 1955).

Electrodialysis makes use of the electrical characteristics of the minerals contained in the water. The salt in the water is composed of sodium and chloride ions, which carry a positive and a negative charge respectively. If an electric current is passed through the brackish water, the sodium ions are attracted towards the negative electrode and the chloride ions towards the positive electrode. This is the basic principle of the process, which is carried out in a plant known as a " membrane press ", because it contains a number of very narrow compartments separated by specially designed membranes, some of which will allow only positive ions to pass through them and others only negative ions. These two types of membrane are alternated throughout the press. When brackish water flows through the compartments bounded by cation membranes the sodium ions are trapped, while the chloride ions are trapped by the anion membrane. The water emerges in two streams, one being virtually free from mineral ions and the other brine.

The efficiency of the process has been greatly increased by the development of membranes having improved permselective properties and conductivity. Since much of the total cost arises from the periodical replacement of membranes, mechanical strength and chemical durability are other important requirements. The Chemical Research Laboratory at Teddington, Middlesex, has taken a prominent part in the development of permselective membranes. In the Union of South Africa research has led to the introduction of a membrane which, in Dr. Rapson's words, is believed to be " not merely much cheaper than those produced overseas but fully as efficient ".

## SOUTH AFRICAN PRACTICE

The apparatus in the National Chemical Research Laboratory, Pretoria, which is capable of handling 250 gallons of water per hour, has for about a year been desalting brackish water brought from the mines and also water artificially made brackish on the spot. It has been shown that, to reduce the salt content from 3,500 to 1,000 parts per million, 8 kWh are required for every 1,000 gallons of water treated. The cost of power for the cells is thus equivalent to 2.4d. per 1,000 gallons, based on bulk electricity at 0.3d. per kWh, which is the price on the goldfields. Other costs are those of the membranes, normal operating expenses, and interest and depreciation on the capital investment. From data obtained from the pilot plant at Pretoria, it has been calculated that overall costs of demineralization will be of the order of 2s. per 1,000 gallons of fresh water. In the United States costs vary from 9d. per 1,000 gals. for brackwater to 1s. 4d. for sea water, and in Holland from 2s. 10d. to 4s. 4d. per 1,000 gals.

A larger plant now being erected at the President Brand mine will handle mine water at the rate of 1,000 gallons per hour and will incorporate a number of improvements resulting from experimental work on the former scale. The staff to operate the plant will be provided by the mines in the area and will be under the control of the Anglo American Corporation of South Africa. The Council for Scientific and Industrial Research will act as consultants.

The new plant is expected to give reliable information about production costs in large-scale working, requirements for future large-scale apparatus, and the behaviour of membranes in practice. It is hoped that it will pave the way for the erection of works capable of purifying water at the rate of millions of gallons a day.

*TITANIUM—II*

# Prospects for Australian Beach Sand Mining

By J. A. DUNN and J. W. MORGAN

**While it is considered that overwhelmingly the world's future supplies of titanium metal must be provided from ilmenite, nevertheless during the development stages of the metal industry over the next few years, the importance of rutile must not be overlooked as this is the raw material which occasions the least difficulty in treatment. The following article discusses the future of the Australian beach sands industry, and concludes the first instalment which appeared in *The Mining Journal* of September 16. The article is condensed from a paper entitled *Titanium and the Australian Beach Sand Industry*, appearing in *The Australian Mineral Industry Quarterly Review, Vol. 8, No. 1.* Dr. Dunn is chief mineral economist, Bureau of Mineral Resources, Geology and Geophysics, Australian Department of National Development.**

From 1957 onwards titanium will develop for commercial uses according to price and relative property advantages over other metals. It is of interest to note a statement which has been made, that, in the event of war, the aircraft industry in U.S.A. would require up to 150,000 tons of metal annually. Recently Prof. H. H. Kellogg, Chairman of the U.S. Government's Titanium Advisory Committee, has forecast that if costs are to be reduced, the move must be for the development of integrated plants of the order of 30,000 tons annual capacity. On the basis of the cost of production which he anticipated at such plants, he predicts that the U.S. consumption of titanium metal will rise at some future date to 200,000 tons a year.

**Wilfley tables being used in Australia to separate silica from the rutile-zircon-ilmenite concentrate**

Looking at the relative consumption of other metals, Prof. Kellogg's figure is by no means unlikely. Assuming developments in other countries to be eventually no less, in total, than those in the United States, a world consumption of up to 400,000 tons at reasonable prices is a conservative target on which industry may base its thinking when examining the raw material aspect for the distant future.

## COSTS AND PRICES

There are no published data on actual costs of the titanium produced in pilot plants to date. However, the price of titanium sponge, produced by the Kroll process, was $5 a lb. up to 1954, but was reduced to $4 a lb. for the highest grade early in 1955, and recently to $3.90 a lb.

It is pertinent to this discussion to appreciate what proportion of this cost is represented by the raw material, rutile. Recent prices of Australian rutile in the U.S. have been around 7 c. per lb. Allowing for treatment losses, this is approximately equal to 14 c. per lb. of recoverable metal content. The cost of the rutile represents 3.6 per cent of the price of the metal.

If ilmenite were used, the recent prices (around $20 per ton) would represent roughly 3 c. per lb. of recoverable metal content, or less than 1 per cent of the price of the metal. If Sorel slag were used the cost (based on present price) would be about 1.8 c. per lb., or 5 c. per lb. of recovered metal, or 1.3 per cent of the metal price. But the cost of chlorine recovery, chlorine losses, and the more complicated processing are factors which militate against the use of ilmenite or slag instead of rutile.

Prof. H. H. Kellogg in his recent study of the development of metal production, examined the possibility of cost reduction under the circumstances postulated. He anticipates that for the Kroll process total costs—raw materials, operating, administration, depreciation, etc.—will be down to 72.6 c. per lb. sponge metal—this estimate may err ±25 per cent. Whatever alternative process may be used any cost advantage is unlikely to be considerable.

With such costs, the percentage attributable to the raw materials become; rutile 19 per cent, ilmenite 4 per cent, Sorel slag 7 per cent. The additional costs due to more complicated treatment become of less relative importance, and in a fully integrated plant may be greatly reduced. The balance is likely to be in favour of Sorel slag, but in any instance, availability and plant location will be the deciding factor in choice of raw materials.

Prof. Kellogg forecasts that, with metal costs at 72.6 c. per lb., the market price for sponge metal will be $1.15 per lb., allowing for repayment of capital over 10 years. He also forecast the price of ingot at $1.30 per lb., and the average price of mill products at $2.09 per lb. These prices may be viewed in relation to recent prices of other metals: stainless steel (321) 23.50 c. per lb., aluminium 23.20 c. per lb., copper 36 c., nickel 64 c., tin 95 c. (up to $1.83 in 1951). Prof. Kellogg's prognostications seem reasonable, having in mind the relative usages of the various metals.

## WORLD RESOURCES

Assuming a likely annual production of titanium sponge of 40,000 tons by 1957, this would require an output of rutile concentrates of the order of 80,000 tons, allowing for treatment losses. This with present usages will require an increase of present world production of rutile by 150 per cent.

If, however, we look further ahead to a distant future world production of some 400,000 tons of metal, the order of requirement of raw materials would be either 800,000 tons of rutile or 1,300,000 tons of ilmenite (around 60 per cent $TiO_2$). These figures mean either a 16-fold increase in present rutile production, or a 130 per cent increase in ilmenite production.

What scope is there for these increases in production?

World production of rutile in 1954 was about 52,000 tons, of which 44,000 tons came from Australia, and 6,000 tons from U.S.A. Recently, a large deposit of rutile has

been found near Puerto Angel, Mexico, and something of the order of 24,000 tons of concentrates is expected to be produced annually. The reserves might justify doubling or trebling this output as demand warrants in the future. There are reserves also available in India as a by-product of ilmenite production—perhaps of the order of 4,000 tons per 100,000 tons of ilmenite produced. Small increases might be obtained from Norway, French Cameroons, South Africa and Gambia. Possibly U.S. production might be increased to some extent. Available reserves of rutile on the East Coast of Australia have recently been estimated at 700,000 tons in high grade deposits (more than 40 lb. of rutile per cu. yd.), and a minimum of 1,500,000 tons in low grade deposits (approximately 20 lb. of rutile per cu. yd.); production of rutile here could be raised in the near future to 80,000 tons annually and maintained at that rate for a period of years.

The best that could be expected is a world total production of rutile concentrates available for metal production and other purposes of the order of 160,000 tons annually, or some three times present world production. Certainly there is no likelihood on the evidence available to-day, that world rutile production could be increased 16-fold.

## ILMENITE PRODUCTION

World production of ilmenite at present is about 1,000,000 tons, of which around 490,000 tons is from U.S.A., about 250,000 tons from India, 110,000 tons from Canada (including Sorel slag), 100,000 tons from Norway, and 25,000 tons from Malaya. In India the reserves of high-grade beach sands exceed 50,000,000 tons of ilmenite content, and production from them could readily be expanded. Increased production may be possible from other beach sands, particularly from those in Florida which at present yield about 150,000 tons annually.

However, to-day about 60 per cent of the world's ilmenite is obtained from massive deposits of mixed ilmenite-magnetite or ilmenite-haematite. These occur in many countries, some containing extensive reserves. Perhaps the largest, at Allard Lake, 22 miles north of Havre St. Pierre on the Gulf of St. Lawrence, contains 150,000,000 tons so far indicated. Only a few of such deposits are as yet worked. Normally a concentrate is produced containing about 45 per cent titanium dioxide by beneficiation of the ore, but the Allard Lake ore is smelted at Sorel, Quebec, to pig iron and a slag containing 72 per cent titanium dioxide. Sorel slag is thus merely a newly developed method of treating a low-grade ilmenite for commercial purposes.

Although ore from several ilmenite deposits will continue to be concentrated by present methods, a trend to the production of a slag from low-grade ferruginous ilmenite as at Sorel is very probable. But it is quite apparent that overwhelmingly the world's future supplies of titanium metal must come from ilmenite, of which there are ample reserves to provide many times the present output.

## SIGNIFICANCE TO AUSTRALIAN RUTILE PRODUCERS

On a conservative estimate it may be assumed that, by 1960, an additional 80,000 tons of rutile will be required. Of this amount, about 24,000 tons will be from Mexico, and perhaps up to 10,000 tons from increased production in U.S.A. The balance of 46,000 tons must come from Australia, India and such other countries as may increase or start production.

Although Australian rutile may be in demand for metal production in the United States during the next few years, over the long term Australian rutile producers may need to turn to Europe to market such increased production as they may now contemplate. In competition with overseas ilmenite producers, only the larger Australian rutile producers with considerable reserves may be acceptable suppliers to metal producers. However, the smaller rutile producers will have the consolation of the continuing requirements of the welding rod and other present-day industries which consume rutile.

## NEED FOR LARGE RESERVES

The lesson in this reasoning is that Australian rutile producers, if they are to have a part in the titanium metal industry, must have available to them individually large reserves which will permit production over a term of many years. Should the time arrive, as forecast by Prof. Kellogg, of integrated companies with capacities of the order of 30,000 tons annually, requiring some 60,000 tons of rutile, it is quite apparent that not only could no single Australian company to-day produce this amount, but no combined six producers could do so. Perhaps one company might be able to expand operations towards this order of production in the distant future. To-day's production of 44,000 tons is scattered over 11 exporters of final concentrates, and in addition there are several smaller operators who supply rough concentrates to exporters for final concentration.

Apart perhaps from one company with the likely reserves, it is apparent that Australian rutile producers will not have a significant place as suppliers of basic raw material when titanium metal expands to large scale production, if organization of rutile production and marketing remains as it is to-day.

Of course, the thought will occur to many, why should not titanium metal be produced in Australia from the local raw materials? Undoubtedly such a proposal will be made in the future when production methods have settled down, but the time is scarcely opportune as yet. As an illustration of what this would imply, Prof. Kellogg estimated that on the basis of a plant of 30,000 tons annual metal capacity, the investment cost would be about $3,500 per annual ton of titanium.

## MARKET IN CONVENTIONAL USES

Recent claims by overseas buyers, both in United Kingdom and United States, that Australian producers are forcing up the price of rutile, warrant comment. It should be borne in mind that the basic market for at any rate the smaller rutile producer is, and will continue to be, in the conventional uses of rutile, particularly for welding rods. Abnormal prices, dictated now by the offers of metal producers, could lead welding rod manufacturers to use ilmenite as a substitute at least temporarily, which, over a period would not be in the ultimate interests of the rutile producers. The price of rutile in the early days of the beach sand industry was £A32 a ton, and its lowest post-war price, in 1948, was £A20 a ton, f.o.b.

Having in mind subsequent inflation, recent contract prices of £A50-55 a ton, at which the bulk of Australian rutile is sold, have not been abnormal, nor could prices up to £A70 a ton, f.o.b., be construed as abnormal. At present some open market prices well in excess of £A70, f.o.b., represent bids for marginal production only and it is unlikely that large sales are being effected at these prices; it is debatable whether such prices are in the best interests of the rutile industry and producers on contract would do well to ignore them and base price revisions on longer term considerations—several producers are well aware of the position. Unfortunately some high prices overseas may be determined by dealers over whom Australian producers have no control.

# Pumping Corrosive Liquors

By C. C. DOWNIE

**The pumping of corrosive and leaching liquors presents many problems in so far as the construction of pump units is concerned. The particular properties of these liquors demand pumps manufactured from corrosion-resistant alloys designed specifically for this particular application. The following article describes current trends in the design of pumps for corrosive liquor movement, and it is of interest to note the varied problems presented and the methods taken to alleviate them.**

The pumping of hot corrosive acid liquors has frequently given rise to practical troubles in various different wet metallurgical operations, and in one extreme instance, caused so much annoyance with pumps continually breaking down, or becoming defective, that the process was abandoned. Troubles of the kind are not uncommon in chemical factories and works engaged on the production of synthetic fibres, and explosives, where it is necessary to handle hot strong solutions of sulphuric (sulphurous) nitric and hydrochloric acids, besides mixtures of these.

Added to the foregoing are leaching liquors such as ferric sulphate, chloride, and nitrate, different chlorinated solutions, acid zinc chloride and sulphate, potassium bisulphate, and many others, all of which have their own particular corrosion problems and tend to wear out the pump units. Not a few of the costly nickel-chromium alloys which resisted hot nitric acid solutions, were found to deteriorate from the action of the associated oxides of nitrogen.

## PUMPS FOR SPECIFIC APPLICATIONS

Pumps made of tantalum might have enjoyed greater popularity, as they can resist corrosion from all of these solutions, had the metal been cheaper. Revent developments with phosphorus pentoxide glasses, which resist hydrofluoric acid, do not appear to lend themselves to the making of pump parts. Specialized base-metal alloys which resist *aqua regia* have not apparently got beyond the experimental stage. Reference, however, is made to the relatively inexpensive alloy of iron and antimony, which can successfully resist a hydrochloric acid solution of 18 per cent concentration at temperatures of 80 deg. C.[1] In this connection, it is interesting to note that while iron was used as a medium for removing antimony from complex tin-lead alloys, some literature suggested that iron does not alloy with antimony.

Earlier types of corrosion-resisting pumps had been lined with porcelain, stoneware, and other ceramic materials, while Ceratherm impellers and pump interiors sufficed for certain purposes, such as circulating and handling acid liquors. More recently greater attention has been paid to the construction of the pump itself, apart from the selection of corrosion-resisting alloys used in place of what might be termed refractory materials, which, although hard, lack the toughness of metals.

When moving liquids which carry large quantities of impurities, centrifugal pumps of ordinary design frequently prove inadequate, since for this work they are both too sensitive and uneconomical. On the other hand, improved vaneless diffuser pumps combine the advantages of the operating economy of vane-type diffuser pumps, with the plain centrifugal pumps. This arrangement has a casing armed with interchangeable liners, which are carried as near to the shaft as possible, and protect the interior of the casing from wear. Between these disc-shaped liners, the impeller revolves, and which, at the impeller exit, forms a diffuser comprising an annular space of radially increasing cross-section. Such space produces an effect corresponding to that of the vane diffuser of a turbine pump, but, unlike the latter, and due to the absence of vanes, is literally unaffected by the cutting action of mechanical impurities in the liquid. In all centrifugal pumps, the greatest water velocity occurs at the impeller exit and diffuser entrance, and as a consequence, the edges of the diffuser vanes wear down rapidly.

Apart from interruptions due to clogging and other causes, this causes a premature and appreciable drop in efficiency. As distinct from this, the smooth walls of the diffuser of this improved pump offer no point of attack to erosive agents. This prevents any appreciable change in the original section areas, and the parts which are exposed to any wear at all are readily replaceable. The presence of casing liners also offers the possibility of varying volume or head by the use of a different impeller, and without changing the pump speed. With the shaft carried in long ring-oiled or ball-bearings, and protected throughout its length from contact with the liquids being pumped by special alloy sleeves, corrosion is resisted. The construction is designed for moving hot liquids, or those having a tendency towards the formation of crystals at sinking temperatures.

The advantages of this class of pump over ordinary centrifugal pumps with vane-type diffuser, are displayed in a range of curves. If with the latter pump the head is assumed to exceed normal by six per cent, the pump will move only 70 per cent of its normal output at a drop of some five per cent in efficiency. Where the head is 10 per cent below normal, the delivery volume rises to 130 per cent of normal, and power consumption advances to 120 per cent, at a simultaneous reduction of efficiency to 96 per cent. With the improved pump, efficiency remains nearly constant, whereas the power consumption is greatly decreased at even a slight amount of throttling, and with its extraordinary capacity for regulation, its uniform efficiency over a wide range of head-delivery combination, holds special benefits.[2]

## VARIATIONS IN DESIGN AND CONSTRUCTION

Centrifugal pumps have nevertheless been improved by having the impeller so designed as to cause a suction on the inner side of the stuffing-box, which effectively prevents acid from getting to the latter. In some instances, where the temperatures in specific cases may be around 140 deg. C. fresh cooling water is employed for the stuffing-boxes. This pump is used for handling solutions saturated with sulphurous acid and boiled with steam, for nitric acid solutions, and other highly corrosive liquors. The pump body is made of acid-resisting high silicon content alloys, and which is held to the bearing base between two cast-iron clamping rings, and is thereby only exposed to compressive stresses.[3]

Two-cylinder reciprocating pumps have likewise been armoured with similar acid-resisting alloys, besides acid-resistant bronzes, and hard-lead. In these, a cover, held in place by means of yokes in the cylinder at its lowest point, permits the cylinder to be cleaned and flushed, while the cone valves used are easily accessible and removable. Operation is quiet and free from vibration due to the use of a large air chamber. The acid-resistant alloy is only used

for the plunger, cylinder liner, stuffing-box, valve seats, and valve cones, whereas the cylinder with valve box, pipe connections, and air chamber, are of cast-iron, and can be inexpensively fabricated, i.e., planed, drilled, and turned, etc. The delivery volume may be adjusted by varying the piston stroke in all models of this pump.[4]

A further variety of corrosive liquid pump is of the vertical type, and is distinguished by the absence of a stuffing-box, where smooth boxes alone are employed for guiding the shaft. A column of the pumped liquid takes the place of the stuffing-box, and which liquid rises in a tube surrounding the shaft. This is long enough to prevent the liquid conveyed to the pump from flowing over the upper edge. While alloy steels have been used, besides selected silicon-irons, and hard lead, most of this class of pump, where exposed to the corrosive liquors, is of a special acid-resisting bronze.[6]

### SPECIALIZED PUMPING ARRANGEMENTS

A totally different approach to the problem of moving corrosive liquids is seen in adaptations of the air-lift pump, where there are no accurately fitting parts, such as pistons and vanes which can come in contact with the former. Where large quantities of such liquids have to be handled, the conveyance is claimed to be best dealt with by this medium. For this purpose, a compressor generates compressed-air, and which is conducted through an air pipe into a raising, or what is termed eduction pipe. The compressed air becomes mixed with the liquid in the eduction pipe, and the resultant aerated mixture, being lighter than the material descending through the supply pipe, sets up a differential pressure between the supply pipe and the eduction pipe. As a consequence, the liquid in the latter rises, and it is only necessary to keep up the supply of a sufficient quantity of air to maintain a steady movement.

The corrosive liquids are discharged from the upper-end of the eduction pipe into a discharge trough. This form of lift depends upon the difference of pressure in the supply and eduction pipes, while the pressure of the air supply is determined by the height of the liquid column in the eduction pipe. It has to be acknowledged that the mechanical efficiency of air-lift pumps is low, but their absolute dependability and complete freedom from trouble have made them indispensable in a large number of undertakings, especially where the conditions of operating are complicated.

Local conditions frequently require that the liquid must first be pumped into an elevated tank, whence it is taken to the point of use. In these instances, the open discharge trough is replaced by a closed pressure vessel equipped with an air-escape valve, and which, during pumping, remains open. This permits the re-expanded air to escape into the atmosphere, and as soon as the pressure vessel is filled with liquid, it closes. The air produced by the compressor at this moment is switched over into the pressure vessel, while the bottom valve on the foot-piece of the eduction pipe closes at the same time. Accordingly, the compressed air displaces the liquid contained in the pressure vessel, and forces it into the elevated tank, through a connection in the bottom of the pressure vessel.

With the liquid having been forced out of the pressure vessel in this manner, the compressed-air is switched over automatically to the eduction pipe again, the air-escape valve in the tank opens, and thereby repeats the cycle. This arrangement has been used for handling all kinds of slurries, besides liquids, the conveying of gun-cotton in explosive factories, and generally handling materials where no contact with accurately fitting parts is wanted.[6]

A further arrangement of pump design for handling liquids mixed with foreign bodies, viscuous solutions, and other materials of similar character, has been constructed in two different models. These designs are of the diaphragm type, since because of the absence of a plunger, no friction results in moving sludgy liquids, and literally excludes wear on internal parts. The two types are in the form of pure suction pumps with free discharge of the liquid being moved against vertical heads of up to 26 ft., and of suction-and-pressure pumps, for a total manometric head of 40 ft., both as stationary and as portable designs.

### DIAPHRAGM TYPES

The first of these are single- or double-acting, and have small outputs between 1,100 and 11,000 g.p.h., while in the second instance, the pumps are single-, double-, or triple-acting, and of outputs of from 1,100 to 17,500 g.p.h. What is claimed to be of special interest is the design of the valves, which permits rapid and positive closing, besides ready accessibility to the interior.

With the purely suction variety, this end is accomplished by a pressure spring, which, during the stroke, firmly presses the valve disc down on to its seat. Because the valve is so large, when it is removed, the ball of the suction valve can be easily removed, and forestalls cleaning difficulties, while the valve spring admits of being compressed by hand, and even while the pump is running, can be removed. With the suction-and-pressure design, the pump interior is rendered accessible by two covers, held in place by yoke and screw, to be removed without the need for special tools, while a ball check is furnished when required for proper functioning of the pump.[7]

A number of other pump designs which are not specifically intended for handling corrosive liquors can be readily adapted for this purpose. Mention is made of a design which does away with the need for foundations, and renders the pump portable, and a combination with small internal combustion engine makes it suitable for pilot plant use, where power supplies are not available. The pump and motor are connected by an intermediate bracket, while the shafts are rigidly coupled.[7]

REFERENCES

1. Wesselinger Gusswerke, Wesseling, Cologne.
2. Carlshutte A.G. Waldenburg-Altwasser, Silesia.
3. Amag-Hilpert-Pegnitzhutte, Nurnberg.
4. Same as No. 3. Alloys by Krupps.
5. Schneider and Brune, Bochum.
6. A. Borsig. Berlin-Tegel.
7. Hammelrath and Schwenzer, Dusseldoff.
8. Klein, Schanzlin and Becker, Frankenthal, Pfalz.

# Potentials of Quartz Mining in Yugoslavia

Yugoslavia is one of the few countries of Europe where deposits of high quality quartz sand exist. This fact is pointed out in *Commercial Information*, Vol. 8, No. 9, in which the Istria deposits are described as having large reserves—analyzing $SiO_2$, 98.5 per cent, $Fe_2O_3$, 0.016 per cent, traces of $TiO_2$ and $Al_2O_3$, 0.03 per cent, Ca Mg, 0.96 per cent with other materials constituting 0.404 per cent. Good quartz sands are mined by opencast methods at various sites in Istria.

Other sources include the Dolne Solnje quarries in Macedonia where the product contains up to 99 per cent silicon and 0.94 per cent iron. Other deposits are situated at Rgotina, Rogatec and Novo Mesto, the total output from all Yugoslav quartz quarries amounting to approximately 70,000 tons per annum. Of this output the Istria operations supplied 20,000 tons of the national production during 1954. Some 25,000 tons are planned from this latter source in 1955 and 35,000 tons in 1956.

# Machinery and Equipment

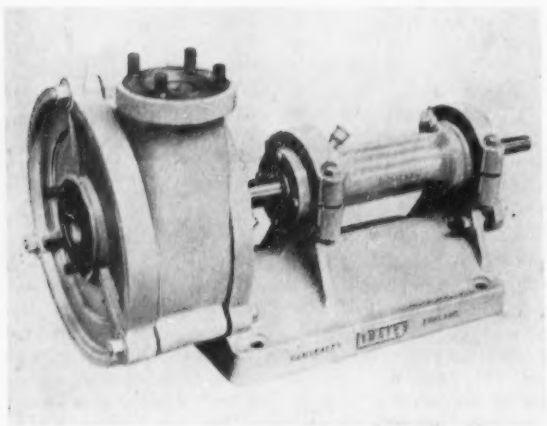
### New Geared Motor

The size 4 Coventry geared motor is a new addition to the existing range of sizes, 1¼, 2½ and 3 geared motors manufactured by The Coventry Gear Co., a David Brown subsidiary.

Available in either double or triple reduction form, the size 4 unit, without motor, weighs 227 lb. and 245 lb. respectively. In double reduction form, with a 1,425 r.p.m. motor, any one of 15 output speeds is available between 105 and 395 r.p.m. In triple reduction form, with a similar motor, the input speed range is 16 gradations from 13 to 95 r.p.m. and the maximum input from 2.5 to 7.5 h.p.

### British Pumps for Argentina

Wilkinson Rubber Linatex Ltd., has obtained an order for 144 Linatex rubber-lined centrifugal pumps. The pumps are to be used in the Argentine mining industry for handling abrasive slurries.



**The 2 in. Linatex pump**

The pumps are the 2in. Linatex model with patented hydrostatic gland for pumping sand and water with a maximum of 20 per cent solids by volume. The pumping operation is carried out at the rate of 25 cu. m. per hour against a total manometric head of 24 metres. Negotiations were conducted through the Instituto Argentine de Promocion del Intercambio.

### A Range of Lubricants

The speciality lubricants for gears, chains, cables, wire ropes and belting manufactured by Revol Ltd., are described in an interesting pamphlet recently received. The Voler lubricants described include the compound, thread lubricant, and drylube as well as the Revol and Revolite bearing belt treatments.

Voler compound is an adhesive graphite compound of high E.P. value which protects all wire ropes and cables and is envisaged as protectant during the exposure of ropes used on cranes or earth-moving equipment. Drylube is designed for use on light open gearing, while Revol and Revolite are designed for lubrication on industrial belts.

### Canadian Belt Conveyor System

Dominion Steel and Coal, St. John's, Newfoundland, has placed in operation an island-hopping belt-conveyor system for iron ore and a new concentrator.

Part of a $15,000,000 expansion programme, the conveyor brings the ore from pits four miles out and under Conception Bay to the concentrator on the surface, then takes the processed ore a further three miles across Belle Island to loading pockets. The conveyor replaces trucks.

# Reviews

**Canadian Mines Handbook, 1955.** *Published by Northern Miner Press Ltd. Pp. 352. Price $3 paper backed or $4 with de luxe binding.*

In a foreword to this volume the editors point out that the search for new mines and the development of established producers have resulted in the most prolific period of expansion yet experienced by the Canadian mining industry. Few minerals have been neglected in the exploration activities of the past year, although emphasis has been laid on uranium, copper and nickel. Meanwhile, established producers continue to achieve production records, and new and potential mines promise renewed spheres of expansion.

Notable features of the last year's operations include the accelerating rate of nickel, copper and precious metals production by International Nickel and Falconbridge, the growing output of nickel and copper from Sherritt Gordon, and increasing iron ore output from Steep Rock as well as the Quebec-Labrador fields. Newcomers to the production field are discussed, particularly Quebec Lithium Corporation, Brunswick Mining and Smelting Corporation, Algom Uranium and Pronto Uranium and Gunnar Mines. In addition, numerous companies are reported as having embarked on extensive diamond drilling and underground development programmes.

The volume is a valuable book of reference that enhances the considerable reputation established by its predecessors.

**The Stock Exchange Official Year Book, Vol. II.** *Published by Thomas Skinner and Co. (Publishers) Ltd. Price for the two annual volumes £7 net. By inland post £7 3s. 6d., and abroad £7 5s. 0d.*

**Register of Defunct and Other Companies, 1955.** *Published by Thomas Skinner and Co. (Publishers) Ltd. Price 30s., including postage.*

The 1955 edition of the Stock Exchange Official Year Book has now been completed with the publication of Volume II of this indispensable financial reference work. The new companies added to the 1955 edition number about 100 and Volume II, which is devoted to the commercial and industrial and mining sections of stocks and shares quoted on the London and Associated Stock Exchange, now gives full particulars of more than 6,250 securities.

This volume also contains the combined index of the whole 1955 edition, as well as the classified list of quoted commercial companies under trade headings and the list of Johannesburg securities in which dealings are permitted in London.

The Register of Defunct Companies for 1955, which also is now available, records the fate of about 22,000 companies which formerly appeared in the Stock Exchange Official Year-Book. The new edition gives the final particulars of about 150 additional companies whose liquidation has been completed.

**The Directory of Directors, 1955.** *Published by Thomas Skinner and Co. (Publishers) Ltd. Pp. 860. Price 45s.*

With its 1955 edition *The Directory of Directors* reaches its 76th year of publication. This year's publication will be found as valuable as the forerunners that have established a wide reputation of value, and some 35,000 names are listed, while in addition to all the public companies, the directors of a large number of private companies are included.

**Safety in Coal Mines, Vol. 11.** *Published by the International Labour Office, Geneva. Pp. 646. Price $3.50 or 21s.*

The first volume of *Safety in Coal Mines* from I.L.O. provided statistical information showing the incidence and chief causes of underground accidents in the coal mines of some of the principal coal-producing countries, together with a survey of the law and practice in matters of coal mining safety in the same countries.

The second volume under review presents, in analytical form, the most important safety provisions of selected mining laws and regulations. In short, all aspects of mining legislation are covered in this comprehensive publication.

# METALS, MINERALS AND ALLOYS

**COPPER.**—The stoppage at Chuquicamata which began on Wednesday of last week ended yesterday with a 10-day suspension of the strike pending negotiations. It appears that the government have had to take strong measures even to achieve this much. The strike which started among clerical staff, who appear to be in the ratio of about one to four of mineworkers, were subsequently joined by workers in the ore transport section which led to a complete stoppage. At the beginning of this week, with no signs of the strike ending, the government decreed a state of seige in five mining provinces for a period of six months. The government said it was taking this action because of the " seditious aims " of the strike and that it had extended it to provinces other than that affected by the strike because it had knowledge of plans to spread the strike to other vital industries in order to damage the country's economy.

An appropriate commentary on these goings-on is to be found in last week's significant statement by Western Electric Co. that it was going ahead with a programme to substitute aluminium for copper in its manufacture of telephone cable. This company, which is the largest U.S. copper consumer with an annual offtake of something like 100,000 tons, attributed its policy change directly to spiralling copper prices coupled with repeated supply shortages. No one is, of course, suggesting that the change over will be either rapid or complete. At the same time this decision is apparently the outcome of several years of careful research and the announcement is undoubtedly the most serious of the several recent psychological knocks which copper has received in recent weeks from the announcement of substitution plans in a variety of industries. Sooner or later copper is going to have to get competitive again and when it does the industry, more particularly in North and South America, will not find the position has been made any easier by the result of substantial wage concessions which have been made to keep production going. The days of 24 c. copper are now beyond recall for the American producers and one imagines that even 30 c. will take some getting down to. In such circumstances the operation of the copper bonus in Rhodesia is likely to provide a much more flexible cost structure.

Meanwhile, the immediate panic over copper supplies in the States seems to be subsiding. The B.D.S.A. has forecast a rough balance between U.S. copper supply and consumption during the fourth quarter and the trade now appears generally not to expect any further advance in the producers' price of 43 c., although customs smelters continue to deal in October deliveries at 50 c. while dealers are quoting 51 c. for what little prompt copper comes on the market. A government official has again confirmed that there is little likelihood of any copper being released from the national stockpile.

The Board of Trade has now invited tenders for the sale of about 13,000 tons of electrolytic copper for pricing and delivery over five months beginning November. All tenders must be in by October 11. This tonnage represents the balance of the 28,000 tons which the Board of Trade announced earlier this year that it would dispose of to the general trader.

**LEAD AND ZINC.**—Last Friday St. Jo Lead raised its selling price by ½ c. to 15½ c. Other sellers appear to have been taken by surprise, but early this week the advance became general. Demand appears to have contracted following the increase although it is still described as satisfactory. St. Jo attributed their action primarily to higher operating costs, but what has in fact made it possible has been the metals firm statistical position. So far this year industrial consumption has been running very close to current production plus imports, the sharp decline in stocks reported here last week being due almost entirely to stockpile offtake. Recently, however, stockpile offerings have been very small and presumably producers are now confident that they can for the present, at least, sustain a higher price if necessary without stockpile support although in the knowledge that this support remains in the background through next year.

This latest price increase has naturally given rise to fresh speculation as to where the U.S. Government intends to draw the line in its lead-zinc support programme. As this is a purely domestic policy the authorities are, presumably, thinking in terms of a combined lead-zinc price which, so far as the U.S. lead-zinc industry is concerned, is the operative one. Some three years ago when lead and zinc prices were on the slide, the industry was talking for the record about a combined price of 30 c. as being the level below which major shutdowns might become necessary. Allowing on the one hand for the several cents negotiating margin which was, no doubt, incorporated in this figure and on the other hand the rise in costs which has since occurred, *The Times* was probably not far wide of the mark this week when it said that the stockpile programme was believed to be operating on a 28 c. basis. Anyway, it would certainly appear that we can look forward to a period of reasonable stability in lead and zinc prices.

At current L.M.E. price levels any further substantial advance in the U.S. quotation would result in allocating bigger shipments to the States.

The U.S. zinc market continues to be extremely firm, more particularly for the special grades, but the market does not expect a further price increase. Producers have not forgotten their unfortunate losses to aluminium in the post-Korean boom, and zinc die-casters must be watching their prices very carefully. As matters stand Mr. H. L. Young, vice-president of the American Zinc Sales Co., was able recently to forecast consumption of zinc in the die-casting industry this year at the all-time record of around 390,000 tons, compared with 430,000 tons in galvanizing He suggests that total U.S. consumption this year may prove to be in the neighbourhood of 1,100,000 tons. This compares with about 876,000 tons last year, and would be an all-time record.

**TIN.**—Industrial unrest in Singapore and uncertainty as to the outcome of the threatened Penang smelter strike, due to begin on October 4, were reflected in a firm tin market here and in New York. Although the Penang smelter strike might very well be avoided, or at any rate postponed, industrial unrest in Singapore has manifested itself in the strike of the employees of the Singapore Traction Co. which has left the Colony without its main means of public transport. Moreover, the manager of the Singapore Traction Co. holds out little hope of an early solution, predicting that the stoppage might last until February, 1956, unless the strikers are prepared to resume work under the old agreement. The transport workers' strike does not affect the tin industry directly but, coming as it does in the midst of general labour unrest in the Colony, the real danger lies in the possibility of the strike spreading to the docks and other vital sections of industry.

An interesting and informative pamphlet entitled " What Tin Mining Means to Malaya " has now been published by the Tin Industry (Research and Development) Board in Malaya. It stresses the point that the tin mining industry cannot much longer serve as one of the two main props of the Federation's economy unless government action is forthcoming to lighten the industry's present swinging tax burden, to encourage prospecting, and the flow of investment capital from abroad.

**ALUMINIUM.**—Because the U.S. primary aluminium expansion goal has now been closed as production capacity in being, under construction, and planned will exceed the original objective of 1,746,000 s.tons by some 32,000 s.tons, the U.S. Government recently refused to grant fast tax write-offs on projected plants. Three companies, nevertheless, Revere Copper and Brass, Kaiser Aluminium and Reynolds Metals, have annnounced that this will make no difference to their plans. St. Joseph Lead Co., however, has stated that it had not yet decided whether it would proceed with its aluminium expansion programme. The government's action does not affect the Olin-Mathieson Chemical Corporation or the Harvey Machine Co. which obtained tax benefits more than two years ago but have not yet started actual plant construction.

During August the U.S. primary aluminium industry once again established record production figures with a total output of 133,550 s.tons. This compared with the previous peak set up in the preceding month of 132,669 s.tons. Thus, the total for the first eight months of this year amounts to 1,026,085 s.tons, an increase of approximately 59,000 s.tons over the 966,857 s.tons reported for the same period a year ago.

The Anaconda Aluminium Co. is to build a pilot plant to test a process it has developed for making aluminium from Pacific north-west clays. Before proceeding with its plans Anaconda is seeking an adequate gas supply in the Spokane, Washington, perimeter as natural gas is said to be the only feasible economic fuel for the reduction of these clays to alumina.

From Hobart, Australia, comes the news that the Australian Aluminium Production Commission's plant at Bell Bay, near Launceston, Tasmania, has been officially opened by the Minister of Supply, Mr. Howard Beale. The Minister said the plant would produce approximately 6,000 tons aluminium this year and possibly 10,000 in 1956. Its potential annual capacity was 13,000 tons.

**CHROMIUM.**—The British Columbia and Yukon Chamber of Mines has reported the discovery of a major chrome deposit in Northern British Columbia. The deposit, described by the Chamber as being "of tremendous importance", was found by prospectors working in the Jennings Lake area about 40 miles south of the Yukon border.

Czechoslovakia has offered to supply Turkey with iron, china and aluminium goods in exchange for Turkish chromium, cotton and dried fruit.

**MANGANESE.**—The G.S.A. has announced a contract under which Ores Beneficiation Inc, of Joplin, Missouri, is to build a pilot plant to study a new process for treating low-grade manganese ores. The maximum costs the company may incur under the contract are $202,100 which will be underwritten by the government. The plant, designed to handle 300 lb. of slags and low-grade ores per hour, will use a process developed by the Bruce Williams Laboratories, also of Joplin.

**NICKEL.**—The O.D.M. has authorized the diversion of a further 1,250 s.tons of nickel from the national stockpile to industrial consumers in October, thus raising the total amount of nickel diverted to non-defence consumers this year to 7,875 s.tons.

**THORIUM.**—The Onego Corporation has announced the discovery of a deposit of thorium ores having an estimated value of $40,000,000, about 75 miles south-east of Sante Fe, New Mexico. The deposit is reported to contain 4,000,000 tons of monazite sand.

**TITANIUM.**—The U.S. Defence Department is planning a new supplementary programme of titanium research and development which will include an extensive expansion of titanium sheet-rolling capacity within the next few months with the object of bringing new alloys to industrial consumers as soon as possible. In making this announcement, Mr. N. E. Promisel, chief metallurgist, U.S. Navy Bureau of Aeronautics, also said that a price of $1 to $1.50 per lb. was not unreasonable to anticipate although the reduction on present price levels which these figures represented would not eventuate for a few years. At present titanium sponge costs between $3.50 c. to $3.95 c. which means that it is still a luxury material compared with aluminium or steel.

The British Metals Corporation have been appointed agents for the sale in the British Commonwealth (except Canada) of titanium and titanium alloy semi-manufactures produced by The Titanium Metals Corporation of America.

**GOLD.**—The Agent General for Western Australia has advised that during August 70,221 f.oz. of gold were received at the Royal Mint, Perth, having a value of £877,762.

**SILVER.**—With supplies still scarce, the silver price has now been marked up in London to 79¼d. per oz. for cash and 79½d. per oz. for forward. These prices are now at their highest levels since March, 1920, and are at the dollar parity. The chief reason for the firm price is the shortage of metal, the supply position of which has not been helped by the slump in the U.S. output which for the first seven months of this year totalled 37,497,000 oz. as compared with 46,180,000 oz. produced in the same period a year ago.

## The London Metal Market

*(From Our Metal Exchange Correspondent)*

If it were not for the uncertainty about the possibility of further labour trouble in Chile it is generally thought that the price of copper would be several pounds cheaper than it is to-day. The period under review has seen rapid fluctuations, as the market had to cope in quick succession with the possibility of the Chilean strike, the illness of President Eisenhower, and the announcement that the U.K. Government were now preparing to dispose of the balance of their trading stock of 13,000 tons. It is hardly surprising, therefore, that consumer demand has also been very patchy, and on some days sellers' price ideas have varied widely.

The other noteworthy feature has been the continued smallness in the backwardation in spite of a decrease of 500 tons in last week's stock figures and the fact that the whole of the backwardation is over the last two months, there even being signs of a contango developing for nearby borrowing. Opinions differ widely on the immediate price trend, but everything points to a lower level by the end of the year, given freedom from labour troubles at the mines. The uncertainty has given rise to attempts to deal in options, and it is hoped that this will develop.

With the tin supply and demand position estimated to be roughly in balance for the year, the news that the workers of the Eastern Smelting Company in Penang had given notice to strike on the 4th October caused firmness in the tin market on fears of a possible shortage developing. However, following a meeting between the workers' union representatives and the Malayan Trades Union Council, the market eased off a little although no decision was taken at this meeting. Should the strike take place it would be a serious threat to supplies as the Penang output accounts for more than half the Malayan production. On Thursday morning the Eastern price was equivalent to £764¾ per ton c.i.f. Europe.

The lead market has been shaken out of its stagnation by the unexpected raising of the U.S. domestic quotation to 15½ c. per lb., but after an initial flurry prices seem to have fallen into a new groove. There appears to be plenty of metal in this country, and it is rare for premiums over the L.M.E. quotations to be obtained in Europe where business remains on a modest scale.

Consumer demand for zinc remains good and there is half-hearted talk of the American zinc producers trying to raise their price in conformity with that of lead, but unless this happens it seems the London price will continue to drift at its present level.

Closing prices and turnovers are given in the following table:

| | September 22 | | September 29 | |
|---|---|---|---|---|
| | *Buyers* | *Sellers* | *Buyers* | *Sellers* |
| **Copper** | | | | |
| Cash | £380¼ | £381¼ | £373 | £373¼ |
| Three months | £378 | £379 | £368¼ | £369¼ |
| Settlement | £381¼ | | £373¼ | |
| Week's turnover | 3,900 tons | | 3,125 tons | |
| **Tin** | | | | |
| Cash | £755 | £756 | £750 | £750¼ |
| Three months | £756 | £757 | £751 | £751¼ |
| Settlement | £756 | | £750½ | |
| Week's turnover | 580 tons | | 345 tons | |
| **Lead** | | | | |
| Current half month | £107¼ | £107⅜ | £108 | £108¼ |
| Three months | £106¾ | £107 | £107⅜ | £107½ |
| Week's turnover | 1,400 tons | | 3,425 tons | |
| **Zinc** | | | | |
| Current half month | £92¼ | £92½ | £91⅜ | £91½ |
| Three months | £92 | £92¼ | £91½ | £91¾ |
| Week's turnover | 2,725 tons | | 2,275 tons | |

### OTHER LONDON PRICES — SEPTEMBER 29

#### METALS

Aluminium, 99.5%, £171 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60% basis) 23s. 6d./24s. 6d. nom. per unit, c.i.f.
Bismuth
(min. 1 ton lots) 16s. lb. nom.
Cadmium 11s. 6d.
Chromium, 6s. 11d. lb.
Cobalt, 21s. lb.
Gold, 250s. 10½d.
Iridium, £30 oz. nom.
Manganese Metal (96%-98%) £269 according to quantity
Magnesium, 2s. 4d. lb.
Nickel, 99.5% (home trade) £519 per ton
Osmium, £24/27 oz. nom.
Osmiridium, £40 oz. nom.
Palladium, £7 0s./£7 10s. oz.
Platinum U.K. and Empire Refined £29 oz. Imported £32 10s. oz.
Rhodium, £40
Ruthenium, £17 oz.
Quicksilver, £92/£94 15s. ex-warehouse
Selenium, 72s. nom. per lb.
Silver, 79¼d. f.oz. spot and 79½d. f'd
Tellurium, 16s. lb.

#### ORES, ALLOYS, ETC.

| | |
|---|---|
| Bismuth | 50% 7s. 3d. c.i.f.<br>30% 5s. 0d. lb. c.i.f. |
| Chrome Ore— | |
| Rhodesian Metallurgical (semi-friable) 48% | £13 per ton c.i.f. |
| ,, Refractory 45% | £13 per ton c.i.f. |
| ,, Smalls 42% | £10 2s. 6d. per ton c.i.f. |
| Magnesite, ground calcined | £26-£27 d/d |
| Magnesite, Raw | £10-£11 d/d |
| Molybdenite (85% basis) | 105s. 0d.-108s. 0d. per unit c.i.f. |
| Wolfram and Scheelite (65%) | 272s./276s. c.i.f. |
| Tungsten Metal Powder (98% Min. W.) | 21s. 7d. nom. per lb. (home) |
| Ferro-tungsten (80%-85%) | 18s. 7d. nom. per lb. (home) |
| Carbide, 4-cwt. lots | £39 3s. 9d. d/d per ton |
| Ferro-manganese, home | £54 10s. 0d. per ton |
| Manganese Ore Indian c.i.f. Europe (46%-48%) basis 100s. freight. | 84d. per unit c.i.f. |
| Manganese Ore (38%-40%) | 69d. per unit |
| Brass Wire | 3s. 5d. per lb. basis |
| Brass Tubes, solid drawn | 2s. 9¾d. per lb. basis |

# THE MINING MARKETS

*(By Our Stock Exchange Correspondent)*

The Stock Market was only slightly affected by the Wall Street slump following the announcement of President Eisenhower's illness. This took the form of inanition rather than heavy falls. Gilt-edged were better with some all-round improvement and paid no attention to the Australian import cuts. This harder tendency was attributed to a fair volume of buying by small investors and also to the better showing of sterling against continental and dollar currencies.

The Kaffir market was also very quiet and price changes, though relatively small, were nearly all downwards. Among finance houses, Anglo American were affected by the fall on Wall Street, and the statement by Johannesburg Consolidated concerning a tax rebate claim to cover the heavy loss on Freddies Consolidated caused these shares to decline also. Union Corporation remained unchanged due to some limited support bolstered by hopes that an announcement will be made before long concerning the Bethel area.

Among individual Rand properties, prices were irregular and mostly lower. The fall in Dominion Reefs was continued but later buyers appeared at the bottom level and the shares recovered some of their loss. Hopes that satisfactory returns would be forthcoming from Hartebeestfontein and Buffelsfontein early next week caused some improvement in these share prices.

In the Orange Free State, one of the most noteworthy features was the sharp drop in President Steyn. This was occasioned by persistent rumours that the next returns would record a drop in values. Free State Geduld also fell back, although in this case the reason was not clear. A block of shares held by Freddies Consolidated in the company has, it is understood, been sold to Johannesburg Consolidated and Anglo American Corporation. Harmony went ahead on dividend hopes and there was also some small speculative inquiry for Merriespruit and Loraine.

Among miscellaneous gold shares, Frontino rose sharply to 27s. 6d. on rumours that the improvement in the mine's condition, as forecast by the chairman at the last meeting, has been realized. Sir John d'El Rey also went ahead due to the improved pooling arrangement for Brazil's foreign currency earnings. Zams fell back in sympathy with the general trend in the copper market.

Among diamond shares, De Beers were easier following the wave of selling on Wall Street. Consolidated African Selection Trust held steady on speculation concerning the possibility of the company making a capital return out of the money received from the Sierra Leone Government. Anglo American Investment rose against the general trend.

Coppers were affected by the initial fall in the metal price and the drop on Wall Street. Late on Wednesday, a rally set in. Most of the leading shares closed well above the worst. Esperanza hardened on the appointment of Sir John Harding as governor of Cyprus. The biggest falls in coppers occurred in those shares which had recently been favoured in America.

Trading in tin shares, both in the Eastern and Nigerian sections, was very quiet although prices tended to be easier due to the lower metal price. In this respect, British Tin Investment was the main sufferer. Beralts also fell back from their recent peak.

The higher price for lead in the United States surprised the market but there was no disposition to put the shares better on this account. Silver also reached its highest level for 35 years but this commodity has certainly not moved forward as others have done in the past decade. The only share to improve in value was Broken Hill South, due to the higher dividend declaration.

Turner and Newall declined in sympathy with the easier trend in U.K. industrials and Associated Manganese remained unchanged after the news that the company is making a bid to buy out the Gloucester Manganese Mines which works a portion of its property.

In the Canadian section, prices fell as was to be expected in sympathy with the United States, but in this case declines were less pronounced. International Nickel are reported to have staked a large new area containing nickel ores initially estimated at some 50,000,000 tons.

| Finance | Price Sep. 28 | + or — on week |
|---|---|---|
| African & European | 3⅜ | —⅛ |
| Anglo American Corpn. | 9⅞ | —⅛ |
| Anglo-French | 21/9 | ..... |
| Anglo Transvaal Consol. | 25/7½ | —7½d |
| Central Mining (£1 shrs.) | 46/9 | —3d |
| Consolidated Goldfields | 61/3 | —9d |
| Consol. Mines Selection | 42/6 | ..... |
| East Rand Consols | 2/- | ..... |
| General Mining | 4⅛ | —⅛ |
| H.E. Prop. | 8/1½ | —3d |
| Johnnies | 42/9 | —1/9 |
| Rand Mines | 3⅜ | —⅛ |
| Rand Selection | 46/10½ | —7½d |
| Union Corporation | 51/9 | ..... |
| Vereeniging Estates | 4½ | ..... |
| Writs | 40/7½ | —7½d |
| West Wits | 38/9 | ..... |
| **Rand Gold** | | |
| Blyvoors | 27/3 | —6d |
| Brakpan | 6/9 | —3d |
| Buffelsfontein | 39/6 | +9d |
| City Deep | 11/9 | —3d |
| Consol. Main Reef | 22/6 | +7½d |
| Crown | 2⅛ | —⅛ |
| Daggas | 2⅛ | —⅛ |
| Dominion Reefs | 28/9 | —2/3 |
| Doornfontein | 25/3 | —3d |
| Durban Deep | 32/6 | ..... |
| E. Champs | 5/6 | —3d |
| E. Daggas | 10/- | ..... |
| E. Geduld (4s. units) | 31/6 | —3d |
| E. Rand Props. | 3⅜ | —⅛ |
| Geduld | 4⅜ | —⅛ |
| Govt. Areas | 7/6 | ..... |
| Grootvlei | 23/4½ | +7½d |
| Hartebeestfontein | 36/6 | ..... |
| Libanon | 8/3 | +3d |
| Luipaards Vlei | 19/6 | —6d |
| Marievale | 22/9 | —3d |
| New Kleinfontein | 6/3 | —6d |
| New Pioneer | 13/6 | —6d |
| Randfontein | 54/6 | —1/- |
| Robinson Deep | 17/- | —od |
| Rose Deep | 10/3 | ..... |
| Simmer & Jack | 4/1½ | ..... |
| S.A. Lands | 22/6 | ..... |
| Springs | 3/3 | ..... |
| Stilfontein | 28/3 | +3d |
| Sub Nigel | 35/- | ..... |
| Vaal Reefs | 31/3 | —6d |
| Van Dyk | 4/3 | —1½d |
| Venterspost | 14/9 | —3d |
| Vlakfontein | 17/9 | ..... |
| Vogelstruisbult | 30/3 | —3d |
| West Driefontein | 5⅛ | ..... |
| **Rand Gold contd.** | | |
| W. Rand Consolidated | 42/6 | —7½d |
| Western Reefs | 38/6 | —10½d |
| **O.F.S. Gold** | | |
| Freddies | 7/6 | —3d |
| Freddies Consolidated | 5/6 | —3d |
| F.S. Geduld | 4⅜ | —⅛ |
| Geoffries | 17/- | —3d |
| Harmony | 33/- | +9d |
| Loraine | 8/3 | +10½d |
| Lydenburg Estates | 18/1½ | —7½d |
| Merriespruit | 9/3 | +3d |
| Middle Wits | 14/3 | —3d |
| Ofsits | 65/9 | —3d |
| President Brand | 71/10½ | —7½d |
| President Steyn | 35/- | —1/6 |
| St. Helena | 31/- | —3d |
| Virginia Ord. | 12/4½ | +4½d |
| Welkom | 19/- | —6d |
| Western Holdings | 4⅛ | —⅛ |
| **West African Gold** | | |
| Amalgamated Banket | 2/3xd | —1½d |
| Ariston | 6/4½ | ..... |
| Ashanti | 24/- | +3d |
| Bibiani | 4/6 | —1½d |
| Bremang | 1/4½ | ..... |
| G.C. Main Reef | 2/9 | ..... |
| Konongo | 2/10½ | ..... |
| Lyndhurst Deep | 1/4½ | ..... |
| Marlu | 7½ | ..... |
| Taquah | 2/1½ | ..... |
| Western Selection | 9/3 | +1½d |
| **Australian Gold** | | |
| Gold Mines of Kalgoorlie | 13/3 | ..... |
| Great Boulder Prop | 11/- | ..... |
| Lake View & Star | 19/- | —6d |
| Mount Morgan | 21/6 | —4½d |
| North Kalgurli | 7/- | —3d |
| Sons of Gwalia | 4/- | ..... |
| Western Mining | 9/4½xd | —1½d |
| **Miscellaneous Gold** | | |
| Cam & Motor | 9/- | +1½d |
| Champion Reef | 4/7½ | —1½d |
| Falcon Mines | 7/1½ | ..... |
| Globe & Phoenix | 25/- | ..... |
| G.F. Rhodesian | 6/9 | ..... |
| Motapa | 1/4½ | ..... |
| Mysore | 3/1½ | —3d |
| Nundydroog | 7/6 | +3d |
| Ooregum | 4/3 | ..... |
| St. John d'El Rey | 15/- | +1/- |
| Zams | 56/10½ | —3/1½ |
| **Diamonds and Platinum** | | |
| Anglo American Inv. | 9½ | +⅛ |
| Casts | 29/6 | ..... |
| Cons. Diam. of S.W.A. | 7½ | ..... |
| De Beers Defd. Bearer | 6⅛ | —⅛ |
| De Beers Pfd. Bearer | 15½ | +½ |
| Pots Platinum | 9/9 | —3d |
| Waterval | 16/6 | ..... |
| **Copper** | | |
| Bancroft | 42/3 | —1/9 |
| Chartered | 68/6 | —4/6 |
| Esperanza | 3/9 | +1½d |
| Messina | 9½ | —½ |
| Nchanga | 15½ | —¼ |
| Rhod. Anglo-American | 5⅛ | —⅛ |
| Rhod. Katanga | 26/- | —9d |
| Rhodesian Selection | 48/6 | 3/6 |
| Rhokana | 42 | —2½ |
| Rio Tinto | 3½ | —⅛ |
| Roan Antelope | 27/10½ | —10½d |
| Selection Trust | 3⅛ | —⅛ |
| Tanks | 8⅛ | —⅛ |
| Tharsis Sulphur Br. | 6¼ | —¼ |
| **Tin (Eastern)** | | |
| Ayer Hitam | 22/6 | —1½d |
| Gopeng | 9/3 | ..... |
| Hongkong | 7/9 | ..... |
| Ipoh | 21/10½ | —7½d |
| Kamunting | 10/1½ | +1½d |
| Kepong Dredging | 3/6 | —1½d |
| Kinta Tin Mines | 15/-xd | —6d |
| Malayan Dredging | 9/4½xd | ..... |
| Pahang | 12/9 | ..... |
| Pengkalen | 12/- | ..... |
| Petaling | 10/3 | —3d |
| Rambutan | 20/- | ..... |
| Siamese Tin | 7/9 | —3d |
| Southern Kinta | 18/7½ | —4½d |
| S. Malayan | 8/1½xd | ..... |
| S. Tronoh | 8/-xd | ..... |
| Sungei Kinta | 16/3 | ..... |
| Tekka Taiping | 7/4½ | —1½d |
| Tronoh | 8/- | —1½d |
| **Tin (Nigerian and Miscellaneous)** | | |
| Amalgamated Tin | 12/4½ xd | —7½d |
| Beralt Tin | 36/10½ | —1/10½ |
| Bisichi | 5/9 | ..... |
| British Tin Inv. | 23/6 | —1/- |
| Ex-Lands Nigeria | 2/6 | ..... |
| Geevor Tin | 14/6 | ..... |
| **Tin (Nigerian and Miscellaneous) contd.** | | |
| Gold & Base Metal | 2/1½ | ..... |
| Jantar Nigeria | 7/- | +3d |
| Jos Tin Area | 14/9 | ..... |
| Kaduna Prospectors | 2/1½ | ..... |
| Kaduna Syndicate | 3/1½ | ..... |
| London Tin | 9/6 | ..... |
| United Tin | 2/- | ..... |
| **Silver, Lead, Zinc** | | |
| Broken Hill South | 60/- | +1/6 |
| Burma Mines | 2/7½ | —1½d |
| Consol. Zinc | 51/9 | —4/- |
| Lake George | 12/10½ | —1½d |
| Mount Isa | 63/1½ | —4½d |
| New Broken Hill | 40/6 | —1/- |
| North Broken Hill | 78/6 | —3d |
| Rhodesian Broken Hill | 14/7½ | —4½d |
| San Francisco Mines | 23/- | —1/6 |
| Uruwira | 6/7½ | ..... |
| **Miscellaneous** | | |
| **Base Metals and Coal** | | |
| Amal. Collieries of S.A. | 51/3 | ..... |
| Associated Manganese | 37/3 | —3d |
| Cape Asbestos | 9/9 | +1½d |
| C.P. Manganese | 33/9 | ..... |
| Consol. Murchison | 58/1½ | —7½d |
| Natal Navigation | 3⅜ | ..... |
| Turner & Newall | 98/- | —4/6 |
| Wankie | 16/7½ | —6d |
| Witbank Colliery | 4 | ..... |
| **Canadian Mines** | | |
| Dome | $29 | ..... |
| Hollinger | $36½ | —4½ |
| Hudson Bay Mining | $120 | —7 |
| International Nickel | $145½ | —6½ |
| MiningCorpn.ofCanada | £8⅛ | —⅛ |
| Noranda | $105½ | —3½ |
| Quemont | £9⅛ | —⅛ |
| Yukon | 4/3 | —4½d |
| **Oil** | | |
| British Petroleum | 5⅝ | —⅛ |
| Apex | 33/3 | —9d |
| Attock | 40/9 | +3d |
| Burmah | 3⅛ | ..... |
| Canadian Eagle | 48/6xc | —3/- |
| Mexican Eagle | 23/- | —3d |
| Shell | 6⅛ | —⅛ |
| Trinidad Leasehold | 39/- | —1/6 |
| T.P.D. | 26/3 | —3d |
| Ultramar | 28/9 | —6d |

# COMPANY NEWS AND VIEWS

### Strength of "Johnnies" Balance Sheet

The full report of Johannesburg Consolidated Investment Company in respect of the year ended June 30, 1955, gives a detailed account of taxation credits which accrued through the adoption of a new investment valuation method. Briefly, the system now introduced means that in future the Corporation will have greater freedom of action in arriving at the figure on which taxation credits or debits in respect of the year's trading will be computed. Investments may now be valued *individually* at cost or market value, whichever is lower. Previously, an *aggregate* valuation at cost or market prices had to be made.

Owing mainly to the recent fall in the market price of Freddies Consolidated shares—of which "Johnnies" holds 7,479,528 shares—the introduction of the new system has brought a considerable financial benefit to the profit and loss account for the year ended June 30, 1955. The figure involved, which has not yet been finally agreed is, at £1,800,000, extremely large. In addition, it is estimated that no liability to U.K. tax will arise in respect of the past financial year apart from distributed profits tax, which will be offset by double taxation relief.

A detailed examination of the corporation's profit and loss account reveals the particularly noteworthy event that investment income made a useful advance to £1,461,857 from £1,274,893. On the other hand, share dealing profits declined to £326,416 from £690,930. The balance of profit before taxation was nevertheless not greatly decreased at £1,928,261 from £2,160,743. But the greatest difference, naturally enough, took place in provision for taxation which at £46,425 compared with £506,909. A much greater surplus at £1,881,836 thus remained than that of £1,653,834 for the previous year

At this point the taxation credit of £1,800,000 was taken in in and £3,470,314 (£1,100,000) subsequently transferred to investment reserve. Dividends covered some three times by earnings absorbed £454,250 as against £506,916 and the balance carried forward decreased to £115,686 from £358,414.

Despite the lower book value of quoted and unquoted investments which fell to £10,845,813 from £14,153,910, the Corporation's financial position remains one of considerable strength. Indeed, taking market prices of quoted shares as at June 30, 1955, the resultant figure of £18,594,431, gives a margin of £7,739,618 over the balance sheet entry. Besides this, net liquid assets including cash and treasure bills of £2,521,045 together with £705,090 in respect of U.K. taxation recoverable amounted to £3,061,729. Thus, whatever the future holds for the hitherto disappointing investment in Freddies Consolidated the Corporation is in a most favourable position to meet contingencies.

At all events, it would be extremely unwise to allow the Freddies Consolidated affair to affect unduly a general assessment of Johnnies' investment merits. Apart from its gold-uranium investments, the company has substantial interests in diamonds, copper and platinum, all of which are doing well. At their present price of around 42s. 9d. the yield of about 7 per cent at present obtainable is attractive. Mr. H. J. Joel is chairman. Meeting, Johannesburg, November 22.

### Anglo American Maintains 20 Per Cent Interim

An interim dividend of 20 per cent has been declared on the Anglo American Corporation of South Africa's issued ordinary capital of £3,917,671 in shares of 10s. This is the same as that paid during the previous financial year ended December 31, 1954, which was followed by a final of 50 per cent.

### Bremang's Improved Outlook

Speaking at the meeting of Bremang Gold Dredging Company held earlier this week, Major-Gen. W. W. Richards, the chairman, stated that mining returns over the past few months had shown considerable improvement. Since announcing results for the first half of the current financial year in his review issued prior to the meeting, profits of £19,276 and £18,611 had been made respectively during July and August. These figures brought total operating profits for the first eight months of the current financial year to approximately £84,972. General Richards said that a total of 5,862,780 cu. yds. of ground had been treated which yielded 27,852 oz. of gold.

These results may be set against a total of 3,865,400 cu. yds. treated during the previous corresponding eight months for a recovery of 17,876 oz. of gold and profits of £15,700. But as the 12 months ended December 31, 1954, represented a difficult period of transition for the company—involving the installation of two dredges at new areas on the Offin River—no direct comparison between profit figures is possible. Regarding the future, General Richards looks for a continuation of the improved results for some time.

### Encouraging Drilling Results from Kalgoorlie Southern

At the meeting of Kalgoorlie Southern Gold Mines, Mr. G. Lindesay Clark, chairman, referred to drilling progress in Hole S.E.7. Previous annual reports, he reminded shareholders, expressed the view that the best indication of ore occurences (south of the Golden Mile) would be an area where the rocks had been subjected to especially severe distortion. It was therefore encouraging that the core in Hole S.E.7 had been of a more marked broken nature than that recovered from previous holes. Drilling tests are continuing.

Extracts from the meetings of Western Mining Corporation and Gold Mines of Kalgoorlie (Aust.) over which Mr. Clark also presided as chairman, will be found on page 390.

### Aluminium Ltd's Sales Up 26 Per Cent

During the first six months of 1955 Aluminium Ltd., increased its sales by 26 per cent over those of the corresponding period of 1954. Net income was up by 24 per cent to $2.33 per share. Present indications suggest that these increases are being maintained. Barring any unexpected adverse developments, a significant improvement would thus appear to be possible over 1954 during which sales amounted to $327,600,000, equivalent to $3.87 per common share.

### Kennecott Buys 52 Per Cent of Tin and Associated

Kennecott Copper Corporation now owns 52 per cent of the equity of Tin and Associated Minerals, the big Nigerian columbite-tin producer formerly under the control of Messrs. Janes and Coskinas. Annual columbite production is some 300 s.tons.

### Take Over Bid for Nigerian Consolidated Mines

Nigerian Consolidated have received tentative proposals for the acquisition of the capital of the Company. Full details will be circulated to shareholders as soon as possible. Meantime, the board recommend shareholders not to dispose of their holdings.

### Kalgoorlie Electric Power Makes Loss

A preliminary statement from Kalgoorlie Electric Power and Lighting Corporation reveals that a net loss of £36,231 after all charges was incurred during the year ended December 31, 1954. This compares with the previous year's profit of £18,119.

### 50s. Per Share Bid for Anglo-Equadorian Oilfields

Receipt has been announced of a conditional offer amounting to 50s. per share for a minimum of 51 per cent of Anglo-Equadorian's equity capital. The offer is receiving consideration and a further statement will be made as soon as possible.

### African Land and Investment Earns Less: Pays More

Dividend receipts during the year ended June 30, 1955, by The African Land and Investment Company advanced to £17,080 from £13,334 during the preceding year. On the other hand, sharedealing profits contracted sharply to £4,738, from £14,577. This was, however, to some extent offset by interest up at £5,143 from £4,027 together with rents and commission at £15,029 compared with £13,570.

| *Year to June 30* | *Total Revenue* | *Taxation* | *Net Profit* | *Dividends* | *To Reserve* | *Carry Forward* |
|---|---|---|---|---|---|---|
| | £ | £ | £ | £ | £ | £ |
| 1955 | 42,609 | 3,073 | 31,415 | 18,937 | 15,000 | 26,225 |
| 1954 | 46,196 | 7,185 | 31,302 | 16,125 | 15,000 | 28,747 |

Despite the fall in total revenue earned, dividends amounting to 21¼ per cent as against 17½ per cent were paid on the issued ordinary capital of £37,500 in ordinary shares of 6s. 8d. each.

Mr. W. M. Barclay is chairman and managing director. Meeting, Johannesburg, October 14.

# Mining Men

**Mr. Donald C. Altman** has now assumed the post of sales manager, Industries Group, Allis-Chalmers Great Britain Ltd. Mr. Altman is a native of Los Angeles, California, and holds the degree of Mechanical Engineering from the University of California.

Headquarters in London of the Industries Group has been located in Salisbury House, London Wall, for approximately 50 years, and it is in charge of the sales of the company's products in the mining and ore processing industries.

**Mr. R. B. Hagart** has resigned as chairman of Daggafontein Mines, Vaal Reefs Exploration and Mining and Western Reefs. **Mr. J. W. Shilling** has been appointed chairman in his place on the boards of Vaal Reefs and Western Reefs, while **Mr. H. C. Coch** succeeds to the chairmanship of Daggafontein.

**Mr. W. Lunsford Long,** of Warrenton, North Carolina, president of the Tungsten Institute, has been elected president of Haile Mines Inc., Tungsten Mining Corporation and Manganese Inc.

**Mr. Michael Menzies** has been appointed a director of West Rand Investment Trust in place of Mr. M. W. Rush, who has resigned.

**Mr. Kenneth Richardson** has resigned his appointment as general manager of Johannesburg Consolidated Investment Co. Ltd. but will continue as an executive director. **Mr. David Archibald Beverley Watson** has been appointed general manager.

**Ventures Ltd.,** the Canadian holding company formed in 1928 and now engaged in mining in many countries of the world through its subsidiaries and affiliates, have appointed **Mr. Robert B. Anderson,** deputy secretary of the U.S. Navy until August, 1954, as President. **Mr. Thayer Lindsay,** founder of Ventures, will be appointed chairman of the board.

**Sir John Wrightson** and **Mr. Peter Wrightson** have been appointed managing directors of Head, Wrightson and Co.

**The Mining and Metallurgical Society of America** held a dinner and meeting at the Mining Club, 33 Broadway, New York, last Wednesday at which Dean Curtis L. Wilson delivered a thought provoking address on "The Strength of a Nation."

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# Gold Mine Returns

## WEST AFRICAN GOLD

| Company | August, 1955 | | | Months since year end | Current Financial Year Total to date | | | Last Financial Year Total to date | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Tons (000) | Yield (oz.) | Profit (£000) | | Tons (000) | Yield (oz.) | Profit (£000) | Tons (000) | Yield (oz.) | Profit (£000) |
| Amal. Banket | 75·0 | 12,139 | 32·0 | 11 | 880·0 | 137,329 | 343·7 | 761·5 | 120,834 | 173·0 |
| Ariston Gold | 39·8 | 10,973 | 44·8 | 11 | 305·5 | 99,920 | 520·4 | 363·8 | 118,737 | 551·0 |
| Ashanti | 28·0 | 17,250 | 72·1 | 11 | 279·5 | 180,186 | 770·4 | 273·0 | 174,665 | 715·5 |
| Bibiani (1927) | 30·0 | 6,250 | 10·0 | 11 | 329·0 | 69,350 | 135·8 | 330·1 | 70,305 | 117·1 |
| Bremang* | 812·3 | 4,017 | 18·6 | 8 | 5862·3 | 26,867 | 84·2 | 3865·4 | 17,876 | 15·7 |
| G.C.M. Reef | 8·5 | 3,090 | 6·1 | 2 | 17·1 | 6,207 | 13·5 | 19·9 | 8,273 | 29·8 |
| Kononga | 3·2 | 3,108 | 15·7 | 11 | 37·4 | 34,680 | 171·7 | 31·2 | 31,754 | 145·6 |
| Lyndhurst Deep | 1·1 | 1,080 | 5·1 | 11 | 11·2 | 12,321 | 63·1 | 11·1 | 12,793 | 62·2 |
| Taquah & Abos. | 28·5 | 6,120 | 3·8 | 5 | 142·0 | 29,285 | 12·5 | 136·4 | 29,549 | 20·8 |

* Cu. yds. dredged. L denotes loss. Profit figures include premium revenue

## AUSTRALIAN GOLD

| Company | 4 weeks to August 9 1955 | | 4 weekly period since year-end | Current Financial Year Total to date | | Last Financial Year Total to date | |
|---|---|---|---|---|---|---|---|
| | Tons (000) | Yield (oz.) | | Tons (000) | Yield (oz.) | Tons (000) | Yield (oz.) |
| Central Norseman | 12·4 | 6,251 | 5 | 61·9 | 34,774 | 60·6 | 32,657 |
| Gt. Boulder† | 112·1 | 28,296 | 9 | 322·5 | 78,762 | 320·6 | 74,329 |
| Gt. Western Cons. | 34·6 | 4,497 | 5 | 156·2 | 22,134 | 165·7 | 19,809 |
| Morning Star | 1·3 | 340 | 5 | 6·8 | 2,291 | 6·9 | 5,054 |
| New Coolgardie | 4·8 | 2,245 | 5 | 24·0 | 10,854 | 24·0 | 11,838 |
| North Kalgurli | 27·6 | 5,965 | 8 | 211·4 | 45,181 | 164·3 | 39,566 |
| Sons of Gwalia | 9·0 | 1,484 | 8 | 74·1 | 14,559 | 73·7 | 16,758 |

* Cu. yds. dredged.
† Quarterly

## SOUTHERN RHODESIAN GOLD

| Company | August, 1955 | | | Months since year end | Current Financial Year Total to date | | | Last Financial Year Total to date | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Tons (000) | Yield (oz.) | Profit (£000) | | Tons (000) | Yield (oz.) | Profit (£000) | Tons (000) | Yield (oz.) | Profit (£000) |
| Arcturus | 3·1 | 1,081 | 4·9 | 2 | 6·2 | 2,158 | 8·3 | 5·9 | 1,803 | 6·1 |
| Cam & Motor | 24·0 | 7,690 | 40·7 | 2 | 48·0 | 15,259 | 82·2 | 48·5 | 15,052 | 85·8 |
| Falcon Mines | 18·1 | 3,229 | 19·4 | 11 | 192·4 | 34,733 | 117·6 | 186·4 | 31,250 | 105·0 |
| Globe & Phoenix | 6·0 | 3,606 | 21·5 | 8 | 48·4 | 28,386 | 185·5 | 48·6 | 28,833 | 186·6 |
| Motapa Gold* | 17·3 | 2,417 | 2·4 | 8 | 128·3 | 18,016 | 8·1 | 146·3 | 19,995 | 26·6 |
| Muriel Mine | 3·4 | 1,072 | 10·1 | 2 | 6·5 | 2,191 | 20·1 | 6·2 | 2,006 | 20·1 |
| Tebekwe | 4·8 | 902 | 1·3 | 2 | 11·1 | 1,790 | 2·4 | 16·0 | 2,022 | 2·8 |

* Excluding premium gold sales.
L indicates a loss.
† In addition £896 from accumulated concentrates retreated from Dalny Mine

## INDIAN GOLD

| Company | August, 1955 | | Months since year end | Current Financial Year Total to date | | Last Financial Year Total to date | |
|---|---|---|---|---|---|---|---|
| | Tons (000) | Yield (oz.) | | Tons (000) | Yield (oz.) | Tons (000) | Yield (oz.) |
| Champion Reef | 11·3 | 4,216 | 8 | 115·6 | 41,341 | 120·0 | 46,667 |
| Mysore | 16·2 | 5,314 | 8 | 129·6 | 40,995 | 143·5 | 53,978 |
| Nundydroog* | 18·5 | 6,026* | 8 | 146·8 | 45,269 | 171·8 | 49,539 |

* Includes tailings

## MISCELLANEOUS GOLD

| Company | August 1955 | | Months since year-end | Current Financial Year Total to date | | Last Financial Year Total to date | |
|---|---|---|---|---|---|---|---|
| | Tons (000) | Yield (oz.) | | Tons (000) | Yield (oz.) | Tons (000) | Yield (oz.) |
| Br. Gv. Consol* | 130·5 | 1,152 | 8 | 1323·2 | 11,063 | 1563·7 | 13,813 |
| Clutha River* | 243·0 | 511 | 5 | 1192·0 | 2,337 | 1074·0 | 1,541 |
| Frontino | 11·9 | 8,034 | 8 | 94·1 | 50,424 | 82·9 | 46,301 |
| Kentan (Geita) | 23·5 | 3,410 | 2 | 47·0 | 6,817 | 44·0 | 6,835 |
| St. John d'El Rey | 29·1 | 135† | 8 | 202·3 | 880·7† | 207·0 | 944·8† |

* Cu. yds. dredged.
† Value £(000)

# WESTERN MINING CORPORATION

## VALUE OF GOLD SUBSIDY

The 22nd annual ordinary general meeting of Western Mining Corporation Ltd., was held on September 15 in Melbourne.

**Mr. G. Lindesay Clark, B.Sc., M.M.E.** (Chairman and Managing Director) presided and in the course of his speech said :

(All figures are quoted in Australian currency.)

Net profit from the year's operations amounted to £214,567, and was attributable chiefly to dividends received from Central Norseman Gold Corporation N.L. and Gold Mines of Kalgoorlie (Aust.) Limited. No dividend was received this year from New Coolgardie Gold Mines N.L. Net profit is lower by £33,409 than that for the year ended March, 1954. The major factor contributing to the fall was the item, Interests in Properties, written off, which, for the year under review, was £28,548 compared with £4,244 for the previous year. The Corporation's portion of the expenditure incurred in the search for uranium in conjunction with its subsidiary company, Gold Mines of Australia Limited, accounts for practically all this sum.

At the last Annual Meeting I stated that it was the intention of the Board to make a new share issue, and in October, 1954, the issue was made, members being offered one new share for every three shares held. The shares were offered at 12s. 6d. each; 1s. was payable on acceptance and the first call of 5s. per share was payable in February, 1955. There is an amount of 6s. 6d. per share uncalled on this issue. No decision has yet been reached as to the date of the final call, but it is unlikely to be made before 1956.

Two dividends, Nos. 14 and 15, both of 6d. per share, were paid on August 20, 1954, and February 25, 1955, respectively. Dividend No. 16, which was declared in the current financial year and paid on August 19, 1955, was also at the rate of 6d. per fully paid share; the partly paid new issue shares participated in this dividend at the rate of 3d. per share.

There has been greater activity in the prospecting side of the business for metals other than gold during the year. Extensive areas were examined for uranium, without locating any attractive deposit.

We have secured leases over extensive lithium deposits some 20 miles south-west of Kalgoorlie which some day may be of value. Work on this project is confined to investigation of treatment and possible markets.

There are other prospects under consideration but investigation of these has not yet advanced sufficiently far to reach any decisions.

No areas have been acquired warranting the search for petroleum.

## VALUE OF GOLD SUBSIDY

The Chairman reviewed the extensive gold-mining interests and developments, and continued :—

I referred at the last Annual Meeting to the decision of the Federal Government to assist the gold-mining industry by means of a subsidy. The Gold Mining Industry Assistance Act, which provides for the payment to producers of a subsidy of up to £2 per fine ounce of gold for a two-year period commencing from July 1, 1954, will be of real benefit to the industry. The subsidy is payable when costs of production exceed £13 10s. per fine ounce of gold and the subsidy payable per ounce is equal to three-quarters of that excess with an upper limit of £2 per ounce. The subsidy is enabling those mines which, at the moment, have small profit margins, to maintain a vigorous development programme without which they would almost certainly be forced to close. Applications for assistance have been made by those mines of the Group eligible for the subsidy.

The object of the subsidy, which is much appreciated by the industry, was to keep in production mines that were in grave danger of closing down through the pressure of increasing costs.

The report was adopted.

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# GOLD MINES OF KALGOORLIE (AUST.)

## MERGING OF ACQUISITIONS

The 4th annual ordinary general meeting of Gold Mines of Kalgoorlie (Aust.) Ltd. was held on September 12 in Melbourne.

**Mr. G. Lindesay Clark, B.Sc., M.M.E.** (the Chairman), presided, and, in the course of his speech said :—

(All figures are quoted in Australian currency.)

The mill treated 211,332 tons, of which 199,950 tons came from the G.M.K. leases and yielded 55,603 ounces of fine gold. This is equivalent to an average recovered grade of 5.56 dwts. per ton and is 0.23 dwts. below the recovered grade for the previous year.

Net profit, £102,922 was £81,343 lower than that earned in the preceding year. As indicated in the Annual Report the difference is accounted for by a fall of £24,824 in total operating revenue (£11,844 of which represents diminished gold premium receipts) and by increases of £43,498 in mining, mostly referable to the Paringa leases, treatment and development redemption costs and £13,021 in administration and interest charges, most of which was incurred on account of the mining companies taken over during the year.

Details of the new issue of 1,869,510 shares offered to members in March, 1955, are set out in the Annual Report. These shares, which were issued at 12/6d. each, are now paid up to 6/- (5/- capital and 1/- premium). The final call of 6/6 per share (5/- capital and 1/6 premium) will, on current expectations, be payable in November, 1955.

Dividends Nos. 6 and 7, each of 9d. per share, were paid on November 9, 1954, and May 5, 1955, respectively. Dividend No. 8, of 9d. per fully paid share and 4½d. per partly paid share, was declared on September 8, 1955, and will be paid on October 27, 1955.

## MERGING OF ACQUISITIONS INTO ECONOMIC UNIT

Particulars of the acquisition, as going concerns, of the properties of Boulder Perseverance Limited, South Kalgurli Consolidated Limited and Kalgoorlie Enterprise Mines Limited, have been set out in the Annual Report. As a consequence of these moves, all the leases of the various properties have been asembled together with those of Gold Mines of Kalgoorlie (Aust.) Limited into a unit of economic size under present conditions.

The combined ore reserves of the Company and its subsidiaries were estimated at March 31, 1955, to be 1,558,000 tons at 5.8 dwts. grade.

On completion of the purchase of the South Kalgurli, Boulder Perseverance and Enterprise companies, a beginning was at once made on the re-organization of the mines into one unit.

The enlargement of the treatment plant to treat the full tonnage is making excellent progress. As will be quite obvious, no economics have as yet resulted from the amalgamation. The first savings of any serious amount will be realized when all the ore from our leases are treated in the enlarged mill. In the mines, some reduction of costs on a minor scale will begin to take place shortly. Later we hope that additional savings can be made following a re-organization of mine transport.

This company has made an offer to purchase the undertaking of New Coolgardie Gold Mines for fully paid shares in G.M.K. In face of rising costs and recent developments its Directors have been finding it difficult to foresee a future as an independent operator. The price offered of 28 shares in Gold Mines of Kalgoorlie (Aust.) Limited for each 100 shares issued in New Coolgardie Gold Mines N.L., requires the issue of 286,272 fully paid shares in Gold Mines of Kalgoorlie, equivalent to 7.7% of its present issued capital.

The companies purchased during the year will qualify, in greater or less degree, for the Federal subsidy on gold mining until the date of liquidation in May last. In total, including probably a small amount for Gold Mines of Kalgoorlie itself, we expect these payments will amount to about £100,000.

The Company's interest in Kalgoorlie Southern Gold Mines N.L. increased from 23% to 24% in consequence of Gold Mines of Kalgoorlie (Aust.) Limited taking up a further 182,620 new shares in this venture. The new shares are paid up to 1s.

The report was adopted.

## KALGOORLIE SOUTHERN GOLD MINES

The 5th annual ordinary general meeting of Kalgoorlie Southern Gold Mines No Liability was held on September 14 in Melbourne.

**Mr. G. Lindesay Clark, B.Sc., M.M.E.** (the Chairman), presided, and, in the course of his speech said :—

(The figures quoted are in Australian currency).

The cost, during the year, of diamond drilling, geological work, lease rents and other items directly associated with the Company's operations amounted to £20,340, and administration, technical and general expenses, less interest received, amounted to £2,045. These two items were transferred to Development Account in the Balance Sheet. This last-mentioned account now stands at £123,412.

The rate of expenditure for the first 20 weeks of the current year has been at about the same rate as for the year under review, and net current assets on hand approximate £20,000. On current indications the rate of expenditure is not likely to increase markedly in the near future, and it is unlikely that any further call on the new issue shares will need to be made before 1956.

After referring in detail to the drilling progress of Hole S.E.7 the chairman continued : Previous annual reports have expressed the view that the best chances of finding an ore occurrence will be in an area where the rocks have been subjected to especially severe distortion, so that the broken nature of the core in Hole S.E.7, which is more marked than in previous holes, is encouraging in this respect. Also, the rocks exposed on hills to the west of Hole S.E.7 show an extensive area of extreme alteration by carbonate solutions.

In view of this, the results obtained between 2,862 feet and 3,066 feet are thought to be significant as, in this general environment, they have shown some siliceous lode material with assays of interest in a number of positions. There seems every reason, therefore, to continue with the Kalgoorlie Southern drilling test.

The report was adopted.

## BREMANG GOLD DREDGING

The eighteenth annual general meeting of Bremang Gold Dredging Co., Ltd., was held on September 26 in London.

**Major-Gen. W. W. Richards, C.B., C.B.E., M.C.,** Chairman, presided.

The following is an extract from the statement of the Chairman circulated with the Report and Accounts for the year ended December 31, 1954 :—

The total gold recovered for the year was 32,020 bullion ounces, a decrease of 1,681 ounces, or 4.9%, compared with the previous year. The aggregate yardage treated was 6,334,880, a reduction of 1.8%. The average value of the ground was 2.42 grains, compared with 2.51 grains, per cubic yard. Working costs were higher, 12.27d. against 10.10d. per cubic yard, owing to rising cost of commodities, wages, etc.

The power supply, both from the Ankobra River Power Company and our own station at Subin Hill, was adequate and the plant well maintained.

Operating expenditure was £323,860, £52,391 higher than last year, due, as previously stated, to increased costs of raw materials and labour charges, against which bullion revenue was down by £32,436, due to the slightly lesser yardage and the lower average value of the ground treated.

No. 1 Dredge re-started dredging operations on the extended areas in March, 1955. After the usual running-in trials, the Dredge has settled down to normal operations, and is now averaging over 200,000 cubic yards per month, yielding more than 1,000 ounces of gold.

### CHAIRMAN'S ADDITIONAL REMARKS

Addressing the meeting, the Chairman said : I am happy to record that the mining Returns over the last few months have shown considerable improvement. In my Review, I gave you the results for the first six months of the current year, and we have since received the July and August Returns which show an operating profit of £19,276 and £18,611 respectively. These bring the figures for the first eight months of the year to 5,862,780 cubic yards treated, producing 27,852 ozs. of gold, and an operating profit of approximately £84,972.

I am loth to forecast the future, especially in the matter of dredging operations, but I think we should be able to look forward to these better Returns for some little time.

The report and accounts were adopted.

# Mining Matters

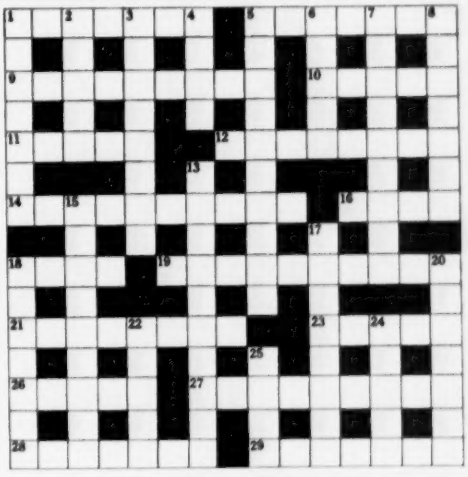
**BTR Mobile Conveyor Belt Service.** British Tyre and Rubber have announced a further extension to the BTR mobile conveyor belt service for the splicing of conveyor belting on site and also for belting repairs. This extension is based with a full complement of operatives and vulcanizing equipment on the company's factory at Burton so that coverage for prompt service extends over the whole country. Enquiries should be made to one of the sales branches as follows : Herga House, Vincent Square, London, S.W.1. Telephone : Tate Gallery 8361; Broughton Bridge, Blackfriars Road, Manchester, 3. Telephone : Blackfriars 7803; 26 Kingston Street, Glasgow C.5. Telephone : South 2782.

**Change of Name.**—As from October 1, 1955, the name of The India Rubber, Gutta Percha and Telegraphs Works Co. Ltd. will be changed to Silvertown Rubber Co. Ltd. and from that date all the company's operations will be carried on under the new name. This change will in no way affect any obligations previously entered into by the company.

**Fraser and Chalmers Contracts for Crushing Plant.** The G. and T. Earle group of the Associated Portland Cement Manufacturers Ltd. have placed with Fraser and Chalmers Engineering Works contracts for limestone crushing plant and shale crushing plant, for their Cauldon project in Staffordshire.

A Dixie moving breaker and back plate hammer mill is being supplied for the shale crushing plant. The mill is direct coupled to a 300 h.p. motor and weighs some 34 tons. The machine is of a type whose general application is for the secondary crushing of sticky rocks and ores. Also included in the contract are a hopper, apron feeder, supporting steelwork and chutes.

For the limestone crushing plant a 72 in. x 19 ft. heavy duty rubber-mounted pan feeder is on order and the design of this feeder is such that it will withstand the shock of stone falling direct from 15 ton dumper trucks. A hopper, structural steel, chutes and access platforms are also included in this contract.



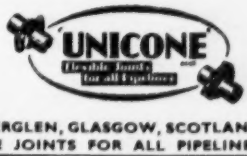
**'UNICONE' CROSSWORD No. 10**

ACROSS.—1. Rough it for a good chap (7). 5. "Stately Spanish galleon coming from the ——" (Masefield) (7). 9. E.G. & C.? It sounds like it. (6, 3). 10. Forceful movement on the canal (5). 11. Helps with the housing problem in the far North (5). 12. No Sir ! Not before this (8). 14. The prizefighters are pleased to begin (10). 16. Boy and why he undergoes a change of sex (4). 18. 501 Sappers. How dreadful (4). 19. Lathe and screw produces these (10). 21. Back Sid ! An explosion could follow (8). 23. Do this to the wind to get in the money (5). 26. A bit steep and very loud at the end (5). 27. Trial Suit. He makes it quite a ceremony (9). 28. Easy on the eye (7). 29. Such a force is a medium one (7).

DOWN.—1. It's putting one's cards on the table (7). 2. Give the article a leg up (5). 3. Pray in Latin to a Spanish river. Very musical (8). 4. As chimney-sweepers, come to — (Shakespeare) (4). 5. I take the can back to the clergyman. It's all wrong (10). 6. The sailor gets in as well (5). 7. Meal drama at breakfast (9). 8. It's all around the countryside (7). 13. Not the fruit of the corn stalk (10). 15. The artist gets up and is taking it easy (9). 17. Medicine man's workshop (8). 18. Don't let your reasoning powers be seduced (7). 20. Unbelievable that there could be a hundred in such a morbid state (7). 22. Not proper (5). 24. Quite well known in its free state (5). 25. The favourites go up what comes down perhaps (4).

*Solution on page 392*

*With the compliments of*

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# THE CLIMAX ROCK DRILL AND ENGINEERING WORKS

## INCREASED TURNOVER

## MR. RALPH EWING ON EXPORT MARKET EXPANSION

The 42nd annual general meeting of The Climax Rock Drill and Engineering Works, Ltd., was held on September 29 in London, **Mr. Ralph Ewing, A.M.I.Mech.E.** (the chairman), presiding.

The following is an extract from his circulated address:—

I am pleased to report a result which is much more favourable than that of last year. Improved trading (particularly in Export Markets) has resulted in our turn-over being increased by 16 per cent over last year's figures.

The net trading profit for the year, before providing for taxation, is £58,750. The comparative figure for the year ended 31st March, 1954, was £9,568, less £819 profit on sales of fixed assets—net £8,749. There was thus an increased trading profit in the year under review of £50,001.

After providing for United Kingdom Income Tax and Profits Tax, the balance of profit remaining is £29,750, compared with £3,168, for 1954—an increase of £26,582.

The Directors recommend a dividend for the year ended March 31, 1955, of 7½ per cent., less income tax. This compares with 3 per cent., less income tax, in the previous year.

### COMPANY'S OPERATIONS

Our turn-over during the period improved considerably as compared with the previous financial year and this increased turn-over, plus increased productivity enabled us, not only to absorb the cost of increased wages, but also to produce a more satisfactory result than had been anticipated.

The increased turn-over has been due principally to a continuance of sub-contract work in the Home Market and an increase in our export trading.

The trading through our two Subsidiary Companies has not yet reached a profit-earning stage, but the results and prospects in India are definitely improving. The position in Canada has not improved and, in view of very strong American competition, it is doubtful if efforts there can prove profitable without considerable expenditure on increased staff and local manufacture, which is hardly justifiable in view of the demands on our resources from other more profitable markets.

The position in South Africa remains unchanged, and the profit ratio remains poor, owing to the fact that South African prices are much below world prices due to intense local competition. The market is, of course, of value, owing to the large volume of trade.

Our Air Compressor Department has improved during the year and sales are running at a satisfactory level, due mostly to increased export orders.

Sales of our Maxam Equipment have continued to expand and as these consist of the supply of pneumatic valves and cylinders used in numerous industries (and are indeed an essential part of what is now known as "Automation") it can reasonably be anticipated that this Department will continue to expand. At present, in spite of additions to staff and plant, it is difficult to maintain reasonable deliveries owing to the constantly increasing demand.

During the year, we were able to make arrangements for our Plating Department to use, under licence, the well known Durion Hard Chrome Plating Process and the plant has been re-arranged for this purpose. This will make full use of our existing equipment and should prove to be a useful and profit earning development.

While the Company's results for the year have proved satisfactory, it should be noted that further increases in wages occurred during the year with corresponding increases in many items of raw material and factored parts which have to be purchased. Increases have also occurred in the cost of coal, electric power, gas and transport charges. It has only been possible to pass on a small proportion of these increased charges, due to the fact that two-thirds of our products are exported and, are, therefore, subject to severe competition, which has increased in recent months. In many export markets extended terms of payment are necessary and, whilst the help of the Export Credits Guarantee Department in insuring these transactions has been obtained, this has increased the cost. It is essential that stability should be reached with regard to wages, if export trading is to be maintained, because there is a limit to the increasing cost which can be absorbed. Profit margins have already been reduced in spite of efforts to increase productivity.

The report was adopted.

## INTERIM DIVIDEND ANNOUNCEMENTS

| *Company* | *Year end 1955/56* | *Dividends* % | *Date payable* | *This year to date* % | *Total last year* % |
|---|---|---|---|---|---|
| Anglo American | Dec. 31 '55 | 20 | Nov. 18 | 20 | 70 |
| Ayer Hitam (a) | June 30 '55 | 25 | Oct. 14 | 100 | 100 |
| Ashanti ... | Sep. 30 '55 | 20 | Nov. 9 | 20 | 40 |
| Bibiani ... ... | Sep. 30 '55 | 5 | Nov. 9 | 5 | 10 |
| Gopeng (b) ... | Sep. 30 '55 | 10 | Oct. 14 | 20 | 25 |
| Gt. Boulder ... | Dec. 31 '55 | 20 | Nov. 23 | 20 | 50 |
| Kinta Tin (c) ... | Dec. 31 '55 | 12½ | Sep. 30 | 30 | 42½ |
| Tanjong (d) ... | Dec. 31 '55 | 20 | Sep. 30 | 45 | 55 |
| Sungei Besi (e) | Mar. 31 '56 | 10 | Oct. 12 | 10 | 40 |

(a)—Fourth interim (1953-54. 4 interims and 1 final)
(b)—Third interim. (1953-54. 5 interims)
(c)—Third interim. (1954. 4 interims and 1 final)
(d)—Third interim. (1954. 4 interims and 1 final)
(e)—First interim. (1954-55. 4 interims)

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The position is tenable in the University Division of Broken Hill Technical College where the University conducts a Diploma Course in Metalliferous Mining. Facilities will be made available for holders of this Diploma to qualify for the Degree of Bachelor of Engineering (N.S.W. University of Technology).

The successful applicant will be required to conduct the existing courses in Mining at Broken Hill and initiate developments leading to the establishment of Degree Courses in Mining Engineering and Applied Geology: also to initiate and participate in appropriate research work in the area in mining and economic geology.

Further particulars may be obtained from Professor D. W. Phillips, Head of the School of Mining Engineering, Kensington, N.S.W., Australia.

The appointee will be eligible, subject to medical examination, to contribute to the New South Wales Superannuation Fund which will provide a pension of £A1,274 p.a. First class shipping fares to Sydney of appointee and family will be paid.

Professors are eligible for six months' study leave on full salary after three years of service or twelve months after six years of service. Subject to the consent of University Council, Professors are permitted to engage in a limited amount of higher consultative practice.

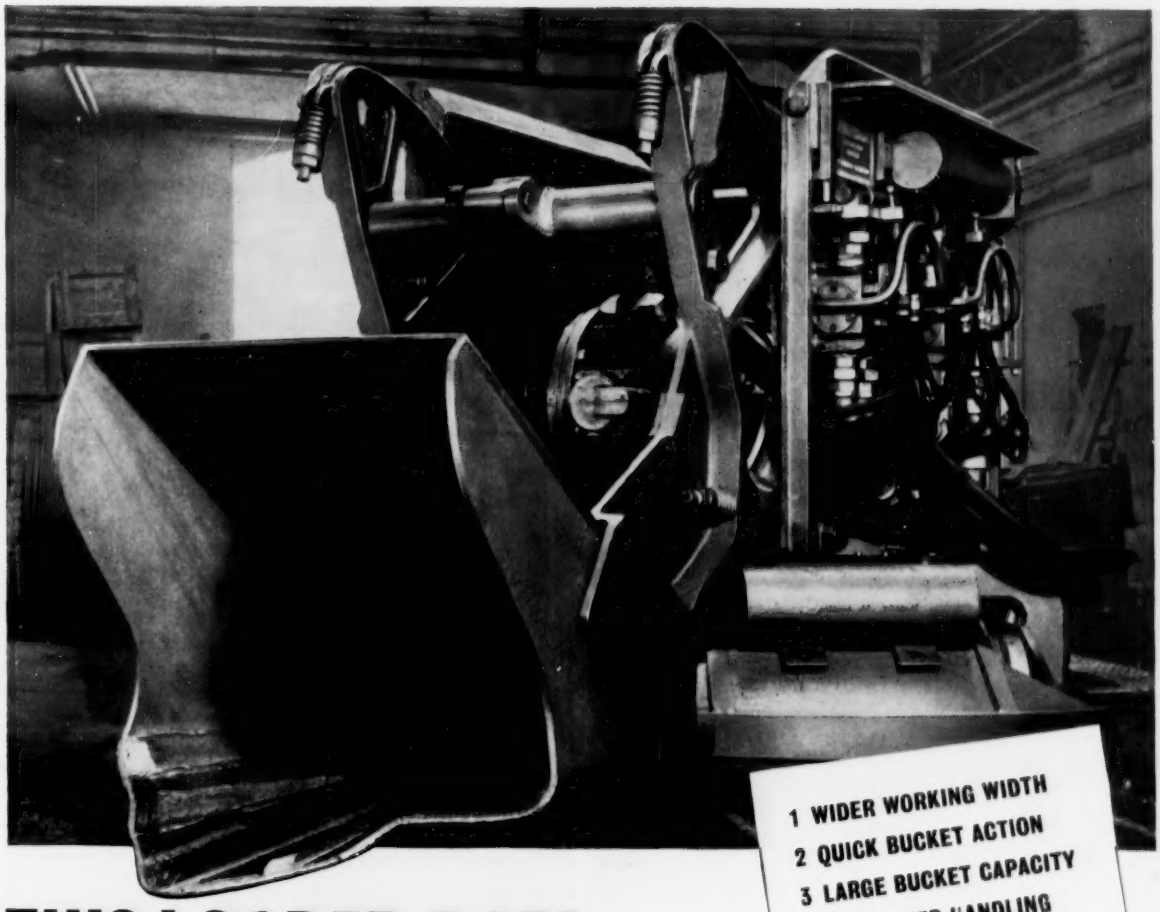
The University reserves the right to fill the position by invitation.

Five copies of applications, together with testimonials and other supporting documents, should be lodged with the Agent General for N.S.W., 56 Strand, London, W.C.2, and a further copy forwarded to the Bursar, N.S.W. University of Technology, Kensington, N.S.W., Australia, by December 16, 1955. Envelopes should be marked "University Appointment".

**CORRECT SOLUTION TO "UNICONE" CROSSWORD No. 10 APPEARING ON PAGE 391**

ACROSS: 1, Diamond; 5, Isthmus; 9, Aegean Sea; 10, Barge; 11, Igloo; 12, Accolade. 14, Gladiators; 16, Lady; 18, Dire; 19, Cartwheels; 21, Disturbs; 23, Raise; 26, Cliff; 27, Ritualist; 28, Slightly; 29, Psychic.

DOWN: 1, Dealing; 2, Angel; 3, Oratorio; 4, Dust; 5, Inaccurate; 6, Taboo; 7, Marmalade; 8, Scenery; 13, Strawberry; 15, Arresting; 17, Pharmacy; 18, Deduces; 20, Sceptic; 22, Unfit; 24, Irish; 25, Step.

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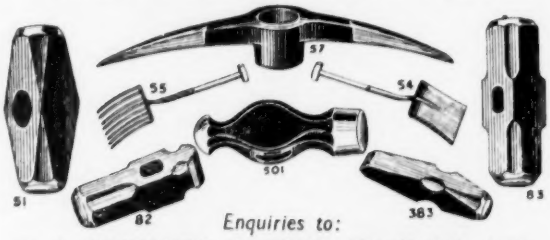


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